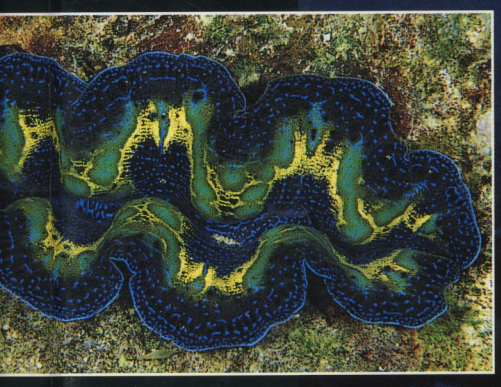


REEF SECRETS

ALF JACOB NILSEN

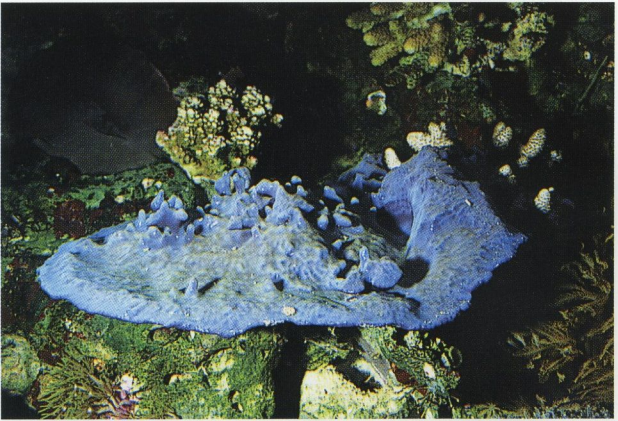
SVEIN A. FOSSÅ

- STARTING RIGHT
- SELECTING FISHES & INVERTEBRATES
- ADVANCED BIOTOPE TECHNIQUES

TABLE 8-1

AQUARIUM ORGANISMS WITH PARTICULAR FOOD PREFERENCES

GROUP	COMMON NAME	SCIENTIFIC NAME	FOOD PREFERENCES
FISHES	Fairy basslets	*Pseudanthias* spp.	Zooplankton in continuous supply. Will, however, normally accept substitutes.
	Longnose Filefish	*Oxymonacanthus longirostris*	Polyps of small-polyped stony corals, preferentially *Acropora* spp. Substitutes are only very rarely accepted.
	Mandarinfishes	*Synchiropus* spp.	Tiny live organisms from live rock.
	Multibarred Angelfish	*Centropyge multifasciatus*	Unknown, but probably selective on small invertebrates and therefore very difficult to keep.
	Orangespine Unicornfish	*Naso lituratus*	Brown algae
	Pipefishes	Many species in Family Syngnathidae	Tiny live organisms from live rock.
CNIDARIA	Strawberry corals	*Dendronephthya* spp.	Phytoplankton
CRUSTACEA	Boxing Shrimp	*Hymenocera picta*	Sea stars
ECHINODERMATA	Feather stars	Order Crinoidea	Need an almost continuous flow of minute live plankton.



Porifera; Demospongiae, Dictyoceratida

Ear Sponge ***Collospongia auris***

Grows indefinitely Indo-Pacific

■ **Lighting** Contains symbiotic algae and needs bright lighting.

■ **Compatibility** Expands rapidly in good conditions and may become a nuisance, overgrowing sessile invertebrates, including corals, and requiring trimming by hand.

An attractive bluish gray sponge found on shallow coral reefs in brightly lit situations. Encrusting or forming horizontal plates with upright lobes resembling tiny ears, hence the popular name.

Porifera; Demospongiae; Haplosclerida; Chalinidae

Soft blue sponge

***Haliclona* sp.**

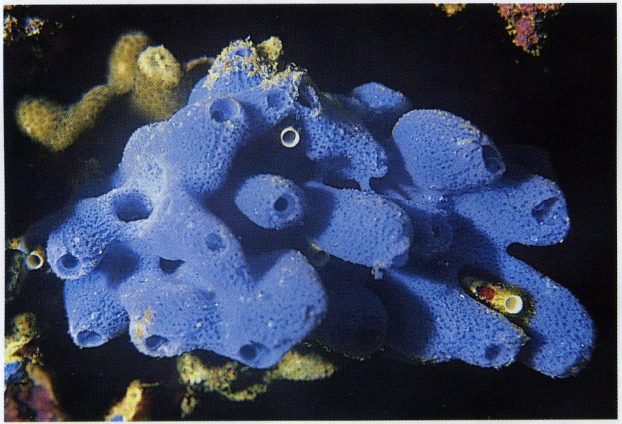
Grows slowly to medium-sized colonies

Indo-Pacific

Circulation Needs medium to strong water currents.

Feeding Difficult to keep nourished. Requires dissolved or very fine suspended organic particles and minute plankton.

Forms bright blue branching colonies. The tissue is soft in comparison to *Xestospongia* (below). Difficult to keep in well-skimmed, nutrient-poor reef systems. Best broken into smaller fragments and planted in different spots in the aquarium.



Porifera; Demospongiae; Haplosclerida; Petrosiidae

Hard blue sponge ***Xestospongia* sp.**

Grows slowly to medium-sized colonies Indo-Pacific

Circulation Needs medium to strong water currents.

Feeding Difficult to keep well fed. Sponges are filter feeders that needs fine suspended organic particles and minute plankton.

Compatibility Dead or dying colonies may release toxins that can kill corals and other invertebrates.

A beautiful blue sponge with dense, hard tissue. Unfortunately, very difficult to keep and often dead upon arrival. Best broken into smaller fragments and planted in different spots in the aquarium.

Porifera; Demospongiae, Halichondrida, Axinellidae

Cork Sponge

Stylissa carteri

Grows slowly to medium-sized colonies

Indo-Pacific

Lighting Needs medium to low light intensities.

Circulation Needs medium to strong alternating water motion.

Feeding Filter feeder that needs fine suspended organic particles and minute plankton.

This orange or yellow-orange sponge forms irregular colonies and is fairly easy to keep. The outward parts of the colonies are thin, laminar and irregular in shape. *Stylissa flabelliformis* is a similar-looking species.

Porifera; Demospongiae; Spirophorida; Suberitidae

Yellow Encrusting Sponge ***Pseudosuberites andrewsi***

Grows slowly to medium-sized colonies Indo-Pacific

Lighting Needs medium to low light intensities.

Circulation Needs medium to strong alternating water motion.

Feeding Filter feeder that needs dissolved or very fine suspended organic particles and minute plankton.

This is a hardy and easy to keep sponge with a bright or light yellow color. Frequently arrives on live rock. Colony may be encrusting or lumpy and irregular.

Porifera; Demospongiae; Halichondrida, Axinellidae

Strawberry sponge ***Pseudaxinella* sp.**

Grows slowly to medium-sized colonies Caribbean Sea

Lighting Needs medium to low light intensities.

Circulation Needs medium to strong alternating water motion.

Feeding Filter feeder that needs dissolved or very fine suspended organic particles and minute plankton.

This pretty species is frequently imported but relatively difficult to keep in most well-skimmed reef systems. As with most sponges, this species must never be exposed to open air, which can become trapped in the animal and lead to tissue decay.

Porifera; Demospongiae; Halichondrida, Desmoxyidae

Red branching sponge ***Higginsia* sp.**

Grows slowly to medium-sized colonies Circumtropical

Lighting Needs medium to low light intensities.

Circulation Needs medium to strong alternating water motion.

Feeding Somewhat demanding filter feeder that needs dissolved or very fine suspended organic particles and minute plankton.

This frequently imported genus includes red branching species from the Caribbean and several yellow or orange species from the Indo-Pacific. They are all eye-catching but rather to difficult to keep over time without special feeding.

Porifera; Demospongiae; Halichondrida, Axinellidae

Yellow finger sponges ***Auletta* spp.**

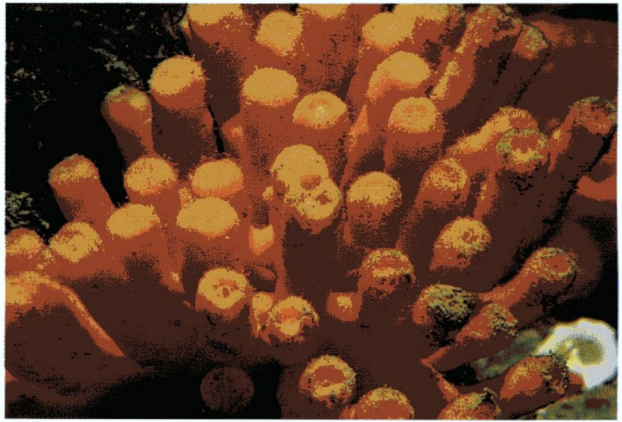
Grow slowly to medium-sized colonies Indo-Pacific

Lighting Need medium to low light intensities.

Circulation Need medium to strong alternating water motion.

Feeding Demanding filter feeders that need dissolved or very fine suspended organic particles and minute plankton.

Several similar species form colorful fingerlike and/or tubular branches rising from a single stalk. Difficult to keep; must be provided with sufficient food and adequate water motion.



Cnidaria; Hydrozoa, Milleporidae

Fire Coral — ***Millepora alcicornis***

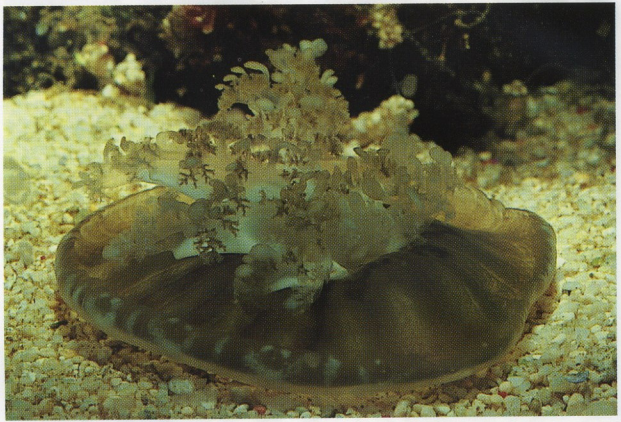
Encrusting, can form large colonies — Caribbean Sea

Lighting Photosynthetic species that needs strong light.

Compatibility Aggressively competes for space with other corals; must not be placed close to other sessile invertebrates.

Hazards Has a powerful sting that will burn humans as well as neighboring corals.

Grows as an encrusting coral with upright branches. Yellow or yellow-orange color. Hairy-like polyps scattered over the entire surface. Occasionally offered for sale.



Cnidaria; Scyphozoa; Rhizostoma, Cassiopeidae

Upside-down jellyfishes ***Cassiopea* spp.**

10-15 cm (3.9-5.9 in.) in diameter Indo-Pacific; Caribbean Sea

Lighting Photosynthetic species that need strong light.

Aquascaping Requires a special aquarium with sandy, open areas, weak water motion, and protection from pump and filter intakes.

Like most jellyfishes, this group alternates between a sexual freeliving medusa generation and a sessile asexual polyp generation. The medusa stage commonly lives upside-down on the bottom, but can also swim in the water column and may have beautiful colors. Not recommended for most reef or "community" aquariums.

Cnidaria; Anthozoa; Ceriantharia; Cerianthidae

Tube anemone ***Cerianthus* sp.**

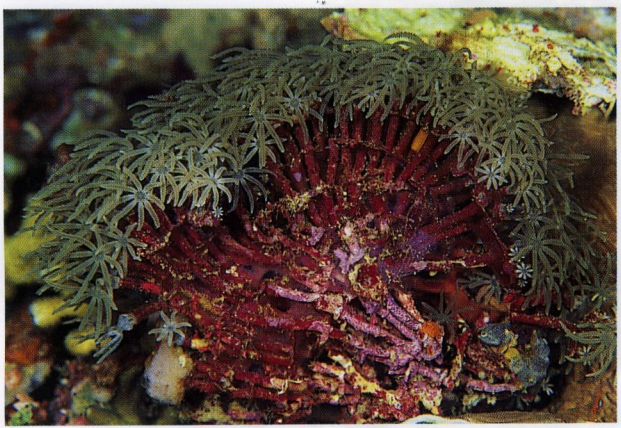
20-40 cm (7.8-15.6 in.) high Circumtropical

Aquascaping Needs thick bottom layer in which the animal can bury its leathery tube and plenty of room to expand its tentacles.

Feeding Needs small live or frozen plankton suspended in the water column for capture by its long, sticky tentacles.

Compatibility Some species have a powerful sting delivered by long tentacles; can easily damage other animals and catch fishes.

A number of genera and species are collected, some very colorful, but most are best kept in their own specialized aquarium.



Cnidaria; Anthozoa; Alcyonacea; Stolonifera, Tubiporidae

Organ-pipe Coral ***Tubipora musica***

Medium to large Indo-Pacific

- **Lighting** Photosynthetic species that needs very strong light.
- **Water Quality** Demands nutrient-poor water and conditions that prevent the colony from being overgrown by hair algae.

Not a true stony coral, but with a distinctive dark red brittle skeleton composed of calcite tubes. Polyps may be light brown, green, or white, and are highly variable in shape, suggesting that several different species may exist. Can be rather difficult to keep, compared with other members of the Order Stolonifera.

Cnidaria; Anthozoa; Alcyonacea; Stolonifera, Clavulariidae

Clove polyp **"*Clavularia* sp."**

Medium-sized Central Pacific

Lighting Photosynthetic species needs very strong light.

Feeding This and other related soft corals may absorb dissolved nutrients, but otherwise need no intentional feeding.

Although nearly impossible to identify, this is one of several similar species that are common and easy to keep. Has long calyces (tubes) into which the polyps can retract completely.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Xeniidae

"Sansibia," Brown star polyp ***Sansibia* sp.**

Spreads indefinitely Central Pacific

Lighting Photosynthetic species that requires very strong light.

Feeding This and other related soft corals may absorb dissolved nutrients, but otherwise need no intentional feeding.

Although brown, this genus makes an attractive addition to the reef tank, with iridescent green or blue highlights, predominantly in the tentacles. Easy to keep and can spread throughout the aquarium.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Xeniidae

Waving hand polyps ***Anthelia* spp.**

Medium-sized Indo-Pacific

Lighting Photosynthetic species need very strong light. Probably feed exclusively from symbiotic algae products.

Water Quality Can be very sensitive to changes in water quality or lighting, for example if activated carbon filtration is suddenly added or increased.

Often imported and hardy. Can grow fast and colonize large areas. Easy to confuse with Stolonifera (see above), but polyps do not retract. The *Xenia*-like polyps arise from a mat, rather than a stalk.

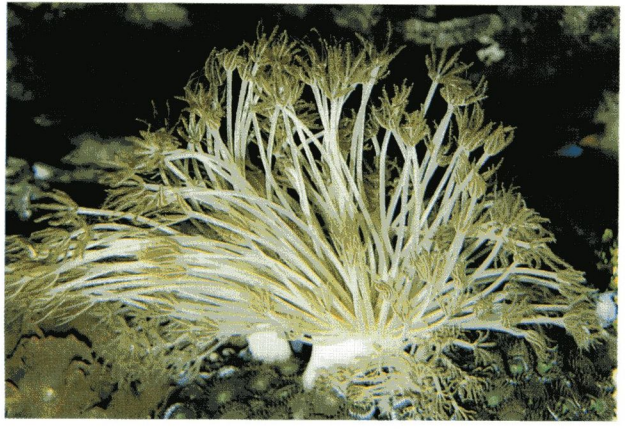
Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Xeniidae

"Blue Xenia" ***Cespitularia* sp.**

Small to medium-sized Indo-Pacific

- **Lighting** Photosynthetic species that requires very strong light.
- **Water Quality** Can be very sensitive to changes in water quality or lighting, for example if activated carbon filtration is suddenly added or increased.

A highly prized soft coral with bright fluorescent colors and polyps that will "pulse" (open and close rhythmically) in certain conditions. This coral is sensitive to transportation and more challenging to keep than other Xeniidae.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Xeniidae

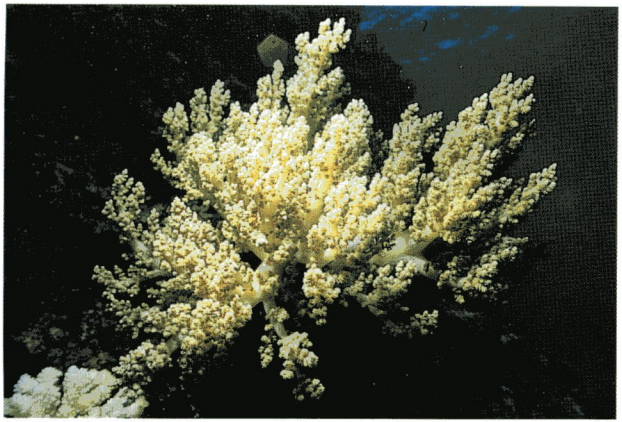
Pulse corals, "Xenia" ***Xenia* spp.**

Small to medium-sized (10 cm [3.9 in.]) Indo-Pacific

Lighting Photosynthetic species that need strong light. Supplemental feeding not required.

Water Quality Can be very sensitive to changes in water quality or lighting, for example if carbon filtration is suddenly added or increased. Sometimes thrive in systems with minimal skimming.

The "pulsing" polyps of this genus can captivate reef observers. Some species are hardy and easy to keep, while others are more demanding. Colors range from white and pale yellow to light brown and brown.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nephtheidae

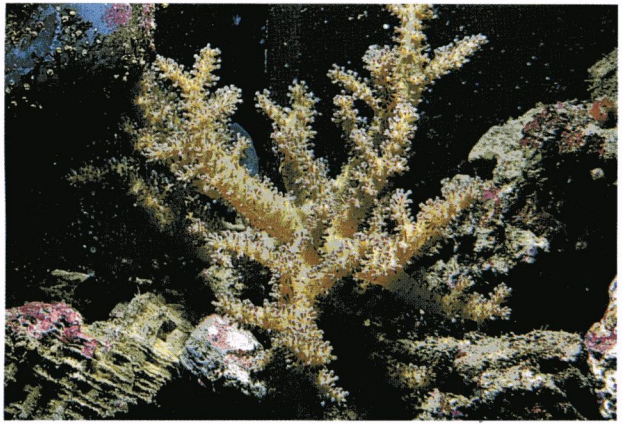
Broccoli corals ***Nephthea* spp.**

Medium-sized to large colonies Indo-Pacific

Lighting Photosynthetic species that need strong light.

Feeding Derive most of their nutrition from photosynthetic products produced by their symbiotic algae, but may also utilize minute plankton.

Excellent "beginner's corals" that are easily kept and fast growing. Simple to propagate by cuttings. Color is usually light brown, with nonretractable polyps. Related to a complex group of large, branching soft corals, including the genera *Neospongodes* and *Litophyton*.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nephtheidae

Broccoli coral ***Neospongodes* sp.**

Medium-sized to large colonies Indo-Pacific

Lighting Most (but far from all) species are photosynthetic and need medium to strong lighting.

Circulation Requires moderate to relatively strong water motion.

Feeding Many of these corals demand regular feedings of minute plankton to thrive.

These are very delicate soft corals, with thin tissue, and are difficult to keep without daily feeding and excellent water conditions.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nephtheidae

Kenya Tree ***Capnella imbricata***

Medium-sized colonies Indo-Pacific

Lighting Photosynthetic species that needs very strong light.

Feeding Nourished primarily by the photosynthetic products produced by its symbiotic algae; does not require intentional feeding.

A hardy, popular coral that is very easy to keep and propagate by cuttings. Reproduces asexually by releasing daughter colonies from its branches. Color may be brown, yellowish brown, or pale yellow, with polyps located at the ends of small branches. One of the first soft corals to be established in European reef tanks in the late 1970s.

Cnidaria; Anthozoa; Alcyonacea; Alcyoniina; Nephtheidae

Spaghetti coral ***Lemnalia* sp.**

Medium-sized to large colonies Indo-Pacific

Lighting Photosynthetic species that needs very strong light.

Feeding Nourished primarily by the photosynthetic products produced by its symbiotic algae; does not require intentional feeding.

An easily kept soft coral that forms large, branching and fleshy colonies. The branches are stiff and supported by many internal sclerites (tiny bits of calcium). Polyps are found only along the small, outer (third) branchlets. Usually brownish yellow or yellow.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nephtheidae

Finger leather ***Paralemnalia* sp.**

Medium-sized to large colonies Indo-Pacific

- **Lighting** Photosynthetic species that needs very strong light.
- **Circulation** Benefits from active, alternating water currents.
- **Feeding** Nourished primarily by the photosynthetic products produced by its symbiotic algae; does not require intentional feeding.

As with many of the soft corals, easy to keep but challenging to identify. Forms medium- to large-sized colonies with distinct branches that arise from an encrusting base. Polyps are often scattered along the branches.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nephtheidae

Strawberry corals ***Dendronephthya* spp.**

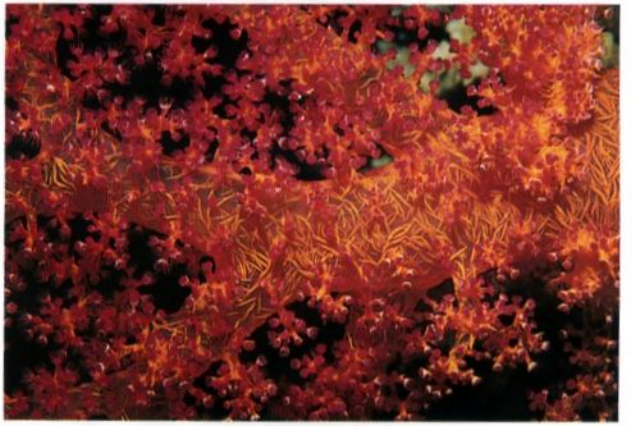
Small to very large colonies Indo-Pacific

Lighting Do not contain symbiotic algae and have no protection against UV-radiation. Require dim to moderate lighting.

Circulation Must have strong back-and-forth water motion.

Feeding Require almost constant feedings with minute phytoplankton—their primary source of nutrition.

Although brightly colored and very beautiful, these corals are delicate and difficult to keep. Suitable only for expert aquarists who can meet their requirements for food and water movement.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nephtheidae

Strawberry coral ***Scleronephthya* sp.**

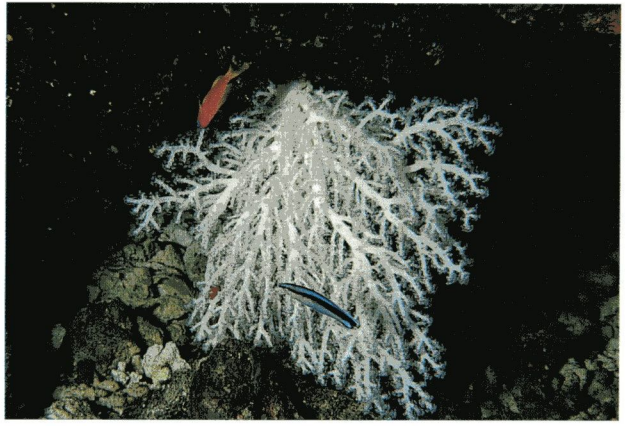
Small to medium-sized colonies Indo-Pacific

Lighting Does not contain symbiotic algae and has no protections against UV-radiation. Requires dim to moderate lighting.

Circulation Must have strong back-and-forth water motion.

Feeding Requires almost constant feedings with minute zoo- and phytoplankton—its primary source of nutrition.

Resembles *Dendronephthya* but polyps are contractile and lack large, polyp-supporting sclerites. Difficult to keep. Often yellow or orange.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nidalidae

"Chironephthya" ***Chironephthya* sp.**

Medium-sized colonies Indo-Pacific

Lighting Does not contain symbiotic algae and has no protections against UV-radiation. Requires dim to moderate lighting.

Circulation Must have strong back-and-forth water motion.

Feeding Requires almost constant feedings with minute plankton and dissolved organic compounds.

A beauty in the wild, but very difficult to keep. Forms tree-shaped colonies often hanging from the roofs of caves in the nature. The colonies can retract and change their size dramatically.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Nidalidae

Devil's hand ***Nephthyigorgia* sp.**

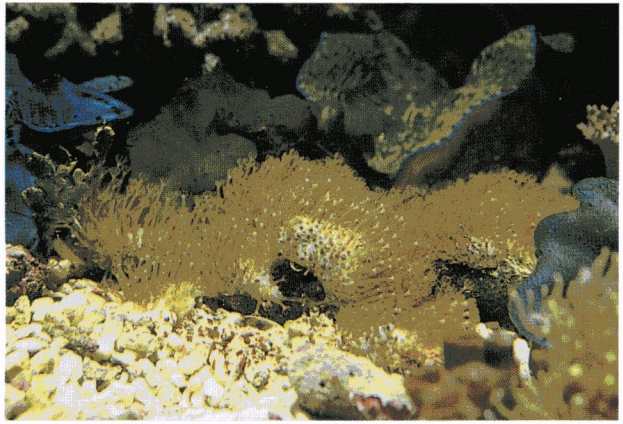
Small colonies Indo-Pacific

Lighting Lacks symbiotic algae and should be given moderate to dim lighting and protection from UV-radiation.

Circulation Needs strong water motion.

Feeding Must be provided with tiny planktonic foods, such as enriched *Artemia* (brine shrimp), that are fed directly to the polyps.

These small finger-shaped colonies are appealing, but difficult to keep for an extended period of time. Best given a special aquarium, where sufficient food and proper water motion can be provided.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Encrusting leather coral ***Rhytisma* sp.**

Medium-sized colonies Indo-Pacific

Lighting Photosynthetic; needs moderate to strong lighting.

Compatibility Competes with neighboring corals and algae by releasing irritating chemical compounds. Can therefore be a potential threat to other corals.

This encrusting soft coral (formerly known as *Parerythropodium* sp.) is regularly imported and both easy to keep and simple to propagate by cuttings. Usually bright yellow, occasionally brown, with long polyps and a thin encrusting base.

Difficult to maintain soft coral (*Nephthyigorgia* sp.) lacks zooxanthellae and demands frequent feedings of small plankton.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Mushroom coral, Leather coral ***Sarcophyton* sp.**

Medium-sized colonies Indo-Pacific

Lighting Contains symbiotic algae; needs high light intensity.

Feeding Nourished primarily by the photosynthetic products produced by its symbiotic algae; probably does not require feeding.

Water Quality Often found on oceanic reefs in nutrient-poor water.

This bright yellow species normally grows in very shallow water and has a mushroom colony shape typical of the *Sarcophyton* genus. An excellent candidate for a special biotope aquarium copying a shallow reef with strong light and water flows.

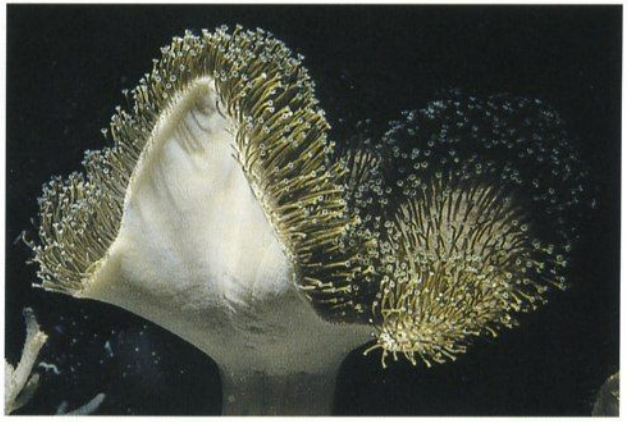
Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Mushroom Coral, Leather Coral ***Sarcophyton ehrenbergi***

Medium-sized colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs strong lighting.
- **Feeding** Nourished primarily by the photosynthetic products produced by its symbiotic algae; does not require intentional feeding.
- **Circulation** Needs moderate to strong water motion.

A hardy and desirable coral that can only be distinguished from other *Sarcophyton* spp. by the shape of its internal sclerites. Can be propagated by splitting large colonies into two halves.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Mushroom Coral ***Sarcophyton tenuispiculatum***

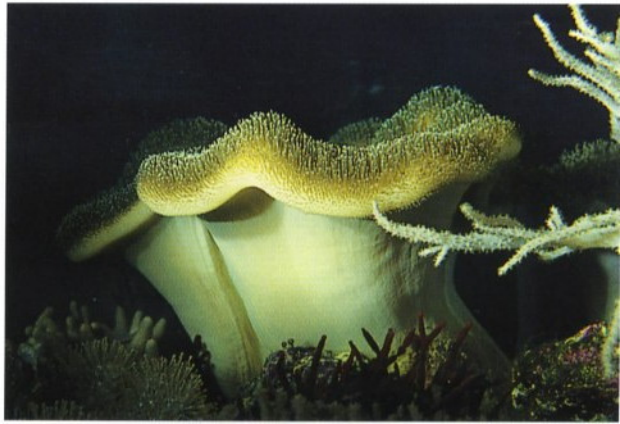
Large colonies Indo-Pacific

Lighting Contains symbiotic algae and therefore needs strong lighting.

Circulation Moderate to strong water motion.

Aquascaping Grows to form a huge colony that will need ample room to expand.

Very hardy and easy to keep leather coral that can reach more than 50 cm (19.5 in.) in diameter in captivity. Difficult to identify when small, but develops a very thick stalk as it matures.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Leather Coral ***Sinularia dura***

Small to medium-sized colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs moderate to high light intensity. May be sensitive to strong UV-light.
- **Feeding** Does not require intentional feeding.

Very common coral in the wild; both hardy and easy to propagate in the aquarium. Forms leaf- or cuplike colonies, which are normally light brown or yellow, with scattered small polyps. Like all *Sinularia* spp. it has only feeding polyps. (Many other soft corals have freckle-like circulatory polyps.) Other closely related species also occur in the trade.

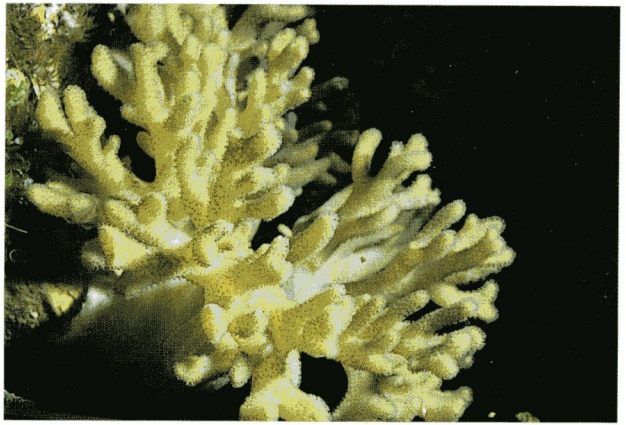
Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Finger Leather ***Sinularia flexibilis***

Large colonies Indo-Pacific

- **Lighting** Photosynthetic; needs moderate to high light intensity.
- **Circulation** Requires moderate to strong water motion.
- **Aquascaping** Needs plenty of space to expand.

Hardy and easy to keep and propagate from cuttings. In the wild, it forms large groups of colonies with long and slender fingerlike lobes flowing from a long, fleshy stalk. Like all *Sinularia* spp. it has only feeding polyps.



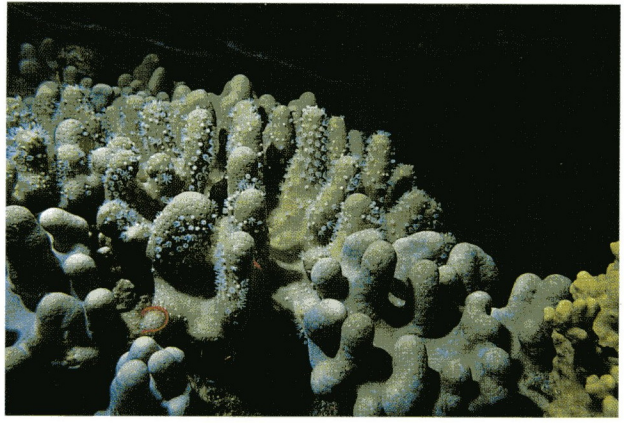
Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Finger leather ***Sinularia* sp.**

Medium to large colonies Indo-Pacific

- **Lighting** Photosynthetic; needs moderate to high light intensity.
- **Circulation** Requires moderate to strong water motion.
- **Aquascaping** Grows rather large and needs space to expand.

Mostly yellowish or light brown, these soft corals are hardy and easy to keep and propagate from cuttings. There are more than 100 described species of finger-shaped *Sinularia*, some with pulsing polyps.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Finger leather corals

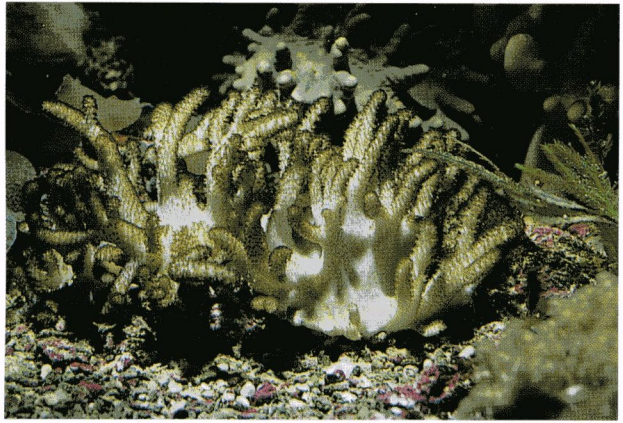
***Lobophytum* spp.**

Medium-sized to very large colonies

Indo-Pacific

- **Lighting** Contain symbiotic algae, need moderate to strong light.
- **Circulation** Require moderate to strong water motion.
- **Aquascaping** Can form large colonies; need plenty of space.

Hardy, common, and easy to keep and propagate from cuttings. These species typically form large, fleshy brown or yellow colonies, usually forming distinct lobes. In the wild, it is not uncommon to see colonies several meters (yards) across.



Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Cauliflower coral ***Cladiella* sp.**

Medium-sized to large colonies Indo-Pacific

Lighting Contains symbiotic algae and needs intense lighting.

Circulation Needs moderate to strong water motion.

Water Quality Needs the best possible water quality; more sensitive than other species when it comes to shifting water quality.

More difficult to keep and propagate than other genera in the family. Usually has white tissue with brown polyps, a coloration that separates the genus from other genera in the family. Colonies are usually slimy to touch and appear bright white with polyps retracted.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Alcyoniidae

Colt coral ***Klyxum* sp.**

Medium-sized colonies Indo-Pacific

Lighting Most species contain symbiotic algae and need strong to moderate light intensities.

Circulation Requires strong to moderate water motion.

Feeding Does not require intentional feeding.

A favorite among reef aquarists; relatively hardy and easy to keep. Formerly regarded as members of *Alcyonium*, this group has many species in the Indo-Pacific. Most are upright and branching, but some encrusting species do occur. Typically slimy to the touch.

Cnidaria; Anthozoa; Alcyonacea; Alcyoaniina; Paralcyoniidae

Christmas tree coral ***Studeriotes* sp.**

To 30 cm (11.7 in.) high Indo-Pacific

Lighting Does not contain symbiotic algae and should be kept in moderate to dim light intensity.

Circulation Needs strong and alternating water motion.

Aquascaping Provide a deep substrate where it can anchor itself.

Feeding Requires tiny planktonic fare, such as live brine shrimp nauplii.

Difficult to feed and keep for a longer period of time, these distinctive corals tend to collapse with little chance of recovery.

Cnidaria; Anthozoa; Alcyonacea; Scleraxonia, Briareidae

Green star polyp — ***Briareum* sp.**

Spreads indefinitely — Indo-Pacific

Lighting Photosynthetic species that needs very strong light. Probably feeds exclusively from symbiotic algae products.

Compatibility Grows rapidly but can easily be trimmed with a razor, peeled up, and transplanted .

Able to form large, bright green patches on rockwork or the walls of the aquarium, this popular star polyp is readily available and easy to keep. The stolon base mat that anchors the polyps is membranous and leathery with a purplish color. The polyps are brown or green.

Cnidaria; Anthozoa; Alcyonacea; Scleraxonia; Briareidae

Green star polyps ***Briareum* spp.**

Grows indefinitely Circumtropical

- **Lighting** Contain symbiotic algae and need strong light intensity.
- **Compatibility** Some encrusting species grow rapidly and can overgrow neighboring corals if not controlled by hand trimming.

Hardy and easy to keep. The finger-shaped *Briareum asbestinum* from the Caribbean is the best known species, but many poorly known species exist in the tropical seas. Many of the Indo-Pacific encrusting species strongly resemble star polyps.

Cnidaria; Anthozoa; Alcyonacea; Scleraxonia; Anthothelidae

Colorful Sea Rod ***Diodogorgia nodulifera***

10-30 cm (3.9-11.7 in.) Caribbean

Lighting Does not contain symbiotic algae and does best in moderate to dim light.

Circulation Requires strong, alternating water motion.

Feeding Needs daily feedings of minute planktonic food; small live *Cyclops* or enriched *Artemia* are best.

Unfortunately impossible to keep if not given proper water motion and planktonic food. Two color forms are frequently imported, one bright red with white polyps, the other yellow with red calyces (right).

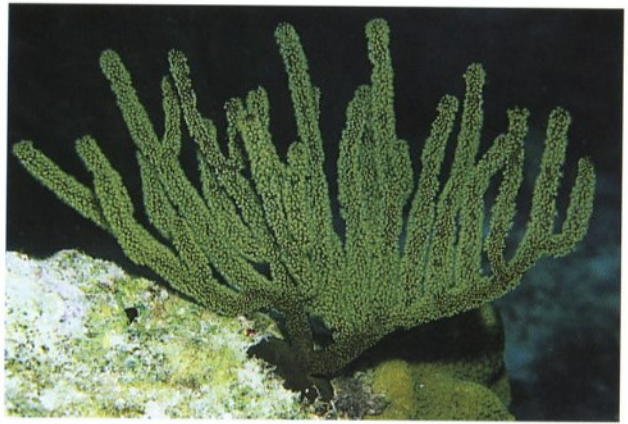
Cnidaria; Anthozoa; Alcyonacea; Scleraxonia; Anthothelidae

Encrusting Gorgonian ***Erythropodium caribaeorum***

Grows indefinitely — Caribbean

- **Lighting** Contains symbiotic algae; needs strong light intensity.
- **Compatibility** Fast-growing and can smother and kill neighboring corals if not controlled by hand trimming.

This is a hardy and easy to propagate coral that will grow very fast if given favorable conditions. It will encrust rock or aquarium glass and has long thin tentacles resembling very fine hair. Usually brown or purple encrusting base and tan tentacles. (Unusual blue morph shown.)



Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Plexauridae

Sea rods — ***Plexaura* spp.**

To 1.5 m (4.9 ft.) — Caribbean

- **Lighting** Contain symbiotic algae and need moderate to strong light intensities.
- **Circulation** Need alternating medium to strong water currents.
- **Aquascaping** Grow large and requires plenty of space.

Hardy and relatively easy to keep. Two species are common: *P. homomalla* (black sea rod, shown at left) with dark brown branches and light brown polyps; and *P. flexuosa* (bent sea rod), with varying colors but often purple with white polyps. Good choice for Caribbean biotopes.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Plexauridae

Porous sea rods — ***Pseudoplexaura* spp.**

To 2 m (6.6 ft.) tall — Caribbean

- **Lighting** Contain symbiotic algae and need moderate to strong light intensities.
- **Circulation** Need alternating medium to strong water currents.
- **Aquascaping** Grow large and require plenty of space.

Robust gorgonians suited to large reef aquariums and Caribbean exhibits. Branches are long and rather thick, with large polyps that are fully retractable. Colors usually grayish with brown polyps. At least four species are known.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Plexauridae

Knobby sea rods — ***Eunicea* spp.**

To 60 cm (23 in.) tall — Caribbean

- **Lighting** Contain symbiotic algae and need moderate to strong light intensities.
- **Circulation** Need alternating medium to strong water currents.
- **Aquascaping** Grow large and require plenty of space.

This is a hardy and relatively easy to keep genus with several species that are quite eye-catching when their polyps are fully expanded. The polyp openings (calyces) of some species protrude above the branch surface, giving the colony a knobby appearance.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Plexauridae

Spiny sea fans ***Muricea* spp.**

To 45 cm (17.6 in.) tall Caribbean

- **Lighting** Contain symbiotic algae and need moderate to strong light intensities.
- **Circulation** Need alternating medium to strong water currents.
- **Aquascaping** Grow large and require plenty of space.

Hardy and relatively easy to keep. Easily confused with knobby sea rods (*Eunicea* spp.). Several species have protruding polyp openings (calyces) and sharp terminal spikes that make the colonies prickly to the touch.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Plexauridae

Red Polyp Octocoral ***Swiftia exserta***

15-45 cm (5.9-17.6 in.) tall Caribbean

Lighting Does not contain symbiotic algae and should be kept in dimly lit conditions.

Circulation Needs vigorous, alternating water motion.

Feeding Must be fed small plankton daily, including enriched brine shrimp (*Artemia*), *Cyclops*, and the like.

A dramatic coral with thin orange branches with large dark red polyps, but one for the advanced aquarist only. Collected in deep reef areas, and difficult to keep without specialized care and equipment.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Gorgoniidae

Sea fans ***Gorgonia* spp.**

30-200 cm (11.7-78 in.)tall Caribbean

Lighting Contain symbiotic algae and need moderate to strong light intensities.

Circulation Need alternating medium to strong water motion

Conservation Collection of this genus is prohibited in Florida and many locations in the Caribbean. Buy legal specimens only.

Small colonies have proven to be hardy if given sufficient light and water motion directed perpendicular to the fan. This genus has three species, with *Gorgonia ventalina* (Common Sea Fan) shown at right.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Gorgoniidae

Slimy Sea Plume ***Pseudopterogorgia americana***

To 2 m (6.6 ft.) tall Caribbean

- **Lighting** Contains symbiotic algae and needs moderate to strong light intensities.
- **Circulation** Needs alternating medium to strong water currents.
- **Aquascaping** Grows large and requires plenty of space.

These bushy or feathery gorgonians are attractive and relatively easy to maintain. *Pseudopterogorgia americana* is one of 15 species in this genus. It produces copious amounts of mucus that is especially slippery to the touch.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Gorgoniidae

Sea Plume ***Pseudopterogorgia bipinnata***

To 2 m (6.6 ft.) high Caribbean

Lighting Contains symbiotic algae and needs moderate to strong light intensities.

Circulation Needs alternating medium to strong water currents.

Aquascaping Grows large and requires plenty of space.

A good beginner's gorgonian; hardy and quite attractive with violet or yellow branches. *Pseudopterogorgia bipinnata* develops feathery branches that are arranged in one plane.

Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Gorgoniidae

Sea whips ***Pterogorgia* spp.**

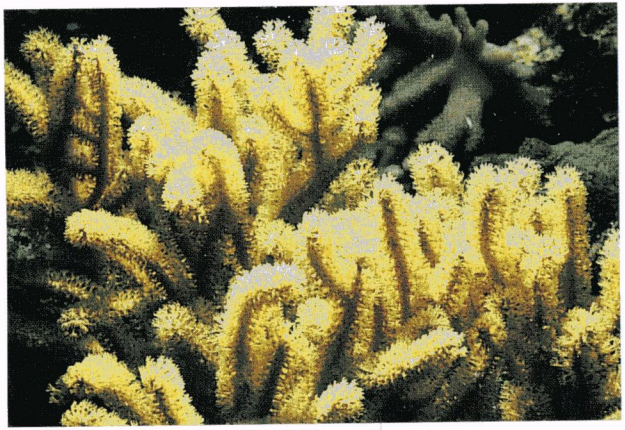
30-60 cm (11.7-23 in.) tall Caribbean

Lighting Photosynthetic; need moderate to strong lighting.

Circulation Need alternating medium to strong water motion.

Aquascaping Grow large and take up plenty of space. Best kept in a sand-zone aquarium where sea whips are allowed to dominate.

Relatively hardy, but more demanding than other photosynthetic species of Caribbean gorgonians. Bushy with well developed, often flattened branches. There are three species, with colors that range from olive to green, bright yellow, or violet, with contrasting polyps.



Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Gorgoniidae

Sea rod ***Rumphella* sp.**

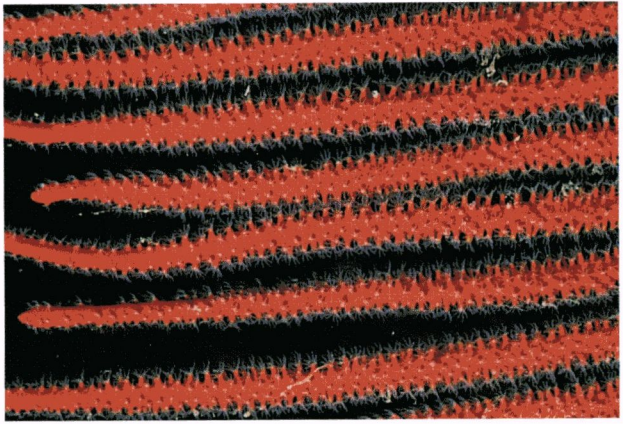
Medium to large colonies Indo-Pacific

Lighting Contains symbiotic algae and needs moderate to strong light intensities.

Circulation Needs alternating medium to strong water motion.

Aquascaping Can grow to form huge colonies and may need a large aquarium.

A very hardy coral and one of only a few photosynthetic gorgonians found in the Indo-Pacific. The common *R. aggregata* forms bushy colonies, usually with a gray or light brown color.



Cnidaria; Anthozoa; Alcyonacea; Holaxonia; Ellisellidae

Sea whips

Ellisellidae

Small to very large colonies

Circumtropical

Lighting Do not contain symbiotic algae and should be kept in moderate to dim lighting.

Circulation Must be given strong alternating water motion.

Feeding Require frequent or continuous feeding of suspended plankton, such as live brine shrimp (*Artemia*).

All members of this family are demanding and very difficult to keep. Thin, colorful branches typically sport gray, yellow, or white polyps. The photo at left shows *Ctenocella pectinata*.

Cnidaria; Anthozoa; Helioporacea; Helioporidae

Blue Coral ***Heliopora coerulea***

Medium-sized to large colonies Central Pacific

■ **Lighting** Contains symbiotic algae and needs moderate to high light intensity.

■ **Circulation** Often found on exposed reefs and should be given moderate to strong water motion.

This unique species has a blue skeleton and resembles a stony coral, but is in fact a very special octocoral. It is hardy, easy to keep and can be propagated by taking fragments. Common in the trade, often growing from live rock.

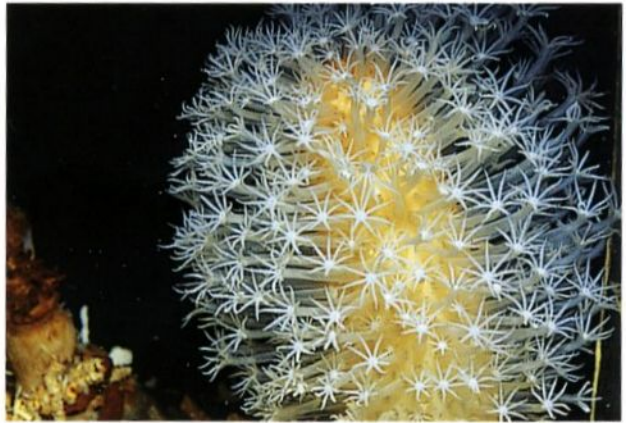
Cnidaria; Anthozoa; Pennatulacea; Veretillidae

Sea pen ***Cavernularia* sp.** (?)

10-30 cm (3.9-11.7 in.) Indo-Pacific

- **Lighting** Nocturnal; keep in very dim light so that it will expand during the day.
- **Circulation** Needs strong alternating water motion
- **Aquascaping** Needs a thick bottom layer of sandy substrate.
- **Feeding** Must be fed regularly with mixed live and frozen plankton.

Interesting animal, but difficult to sustain because of its feeding habits. Has a buried "foot" (peduncle) and an upright part (rachis) containing the feeding and water-pumping polyps.



Cnidaria; Anthozoa; Pennatulacea; Pteroeididae

Sea pen ***Pteroeides* sp.**

10-30 cm (3.9-11.7 in.) Indo-West-Pacific, Eastern Atlantic, Mediterranean

- **Lighting** Nocturnal; keep in very dim light so that it will expand during the day.
- **Circulation** Needs strong alternating water motion
- **Aquascaping** Needs a thick bottom layer of sandy substrate.
- **Feeding** Must be fed regularly with mixed live and frozen plankton.

A real curiosity, but difficult to keep in the aquarium. Big polyp leaves contain the polyps as well as large supporting sclerites.

Cnidaria; Anthozoa; Actiniaria; Actiniidae

Bubble Tip Sea Anemone ***Entacmaea quadricolor***

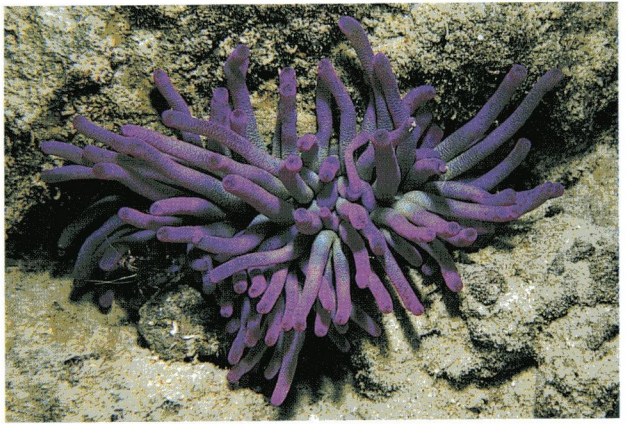
To 40 cm (15.6 in.) across Indo-Pacific

Lighting Contains symbiotic algae and needs strong lighting.

Circulation Requires moderate but steady water motion.

Compatibility Has a strong sting and will severely burn neighboring sessile animals. Best kept in a special aquarium as a host anemone for clownfishes.

Among the more hardy of the sea anemones. Usually brown or greenish brown. Long tentacles, often—but not always—with a bubblelike swelling near the tips. Usually anchored among coral branches



Cnidaria; Anthozoa; Actiniaria; Actiniidae

Caribbean Giant Anemone ***Condylactis gigantea***

To 30 cm (11.7 in.) across Caribbean

Lighting Photosynthetic; needs strong light intensity.

Circulation Needs moderate but steady water motion.

Compatibility Has a strong sting and will severely burn neighboring sessile animals. Best suited for a special aquarium with sand, algae, and crustaceans naturally associated with this anemone.

Relatively hardy, with tentacles that can be purple, pink, green, or whitish, often tipped with color. Commensal shrimps are often associated with this anemone.

Cnidaria; Anthozoa; Actiniaria; Actiniidae

Corkscrew Anemone ***Macrodactyla doreensis***

To 50 cm (19.5 in.) across. Central Pacific

- **Lighting** Photosynthetic; needs strong light intensity.
- **Circulation** Needs moderate but steady water motion.
- **Aquascaping** Needs a deep sand bed in which to bury its column.
- **Compatibility** Has a strong sting and will severely burn neighboring sessile animals.

A commonly available and relatively hardy anemone. The lower column is orange to brilliant red, and the disc is purplish gray to brown, sometimes with radial lines. Has tentacles of equal length.

Cnidaria; Anthozoa; Actiniaria; Stichodactylidae

Magnificent Sea Anemone ***Heteractis magnifica***

To 100 cm (39 in.) across Indo-Pacific

- **Lighting** Photosynthetic; needs strong light intensity.
- **Circulation** Needs moderate but steady water motion.
- **Compatibility** Has a strong sting and will severely burn neighboring sessile animals.
- **Feeding** Carnivore that needs meaty marine foods.

A large anemone with a poor record of survival in the aquarium. Very sensitive to physical damage to its tissue. The column is brilliant purple or bright orange; the tentacles are greenish.

Cnidaria; Anthozoa; Actiniaria; Stichodactylidae

Leathery Sea Anemone ***Heteractis crispa***

25-50 cm (9.8-19.5 in.) across Indo-Pacific

- **Lighting** Photosynthetic; needs strong light intensity.
- **Circulation** Requires moderate to strong water motion.
- **Compatibility** Has a strong sting and can harm sessile animals.
- **Feeding** Carnivore that needs meaty marine foods, such as pieces of shrimp or squid and live adult brine shrimp.

Has a mixed reputation for aquarium survival, and is very sensitive to physical damage to its tissue. The column feels thick and leathery, and the tapering tentacles are the same colors as the disc.

Cnidaria; Anthozoa; Actiniaria; Stichodactylidae

Beaded Sea Anemone ***Heteractis aurora***

5-25 cm (2-9.8 in.) across Indo-Pacific

- **Lighting** Contains symbiotic algae; needs strong light intensity.
- **Circulation** Needs moderate to strong water motion.
- **Water Quality** Needs long acclimation and perfect water quality.
- **Compatibility** Has a strong sting and will severely burn neighboring sessile animals.

With its beaded tentacles (see photo), this is an interesting and relatively hardy anemone if provided with the proper conditions. Upper stem and disc are gray, brownish, or green.

Cnidaria; Anthozoa; Actiniaria; Stichodactylidae

Sun Anemone ***Stichodactyla helianthus***

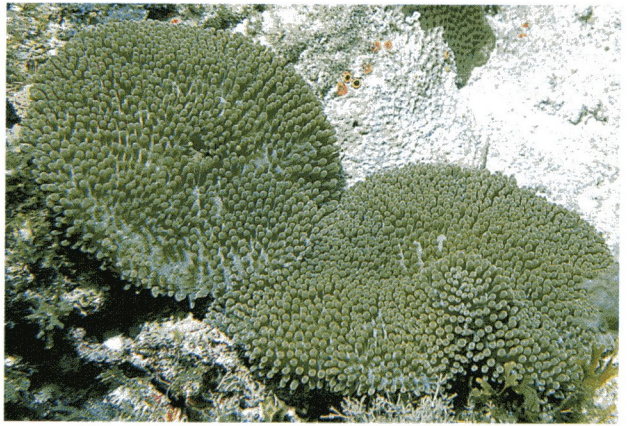
To 12 cm (4.7 in.) across Caribbean

Lighting Contains symbiotic algae and needs intense lighting.

Water Quality Needs long acclimation and perfect water quality.

Compatibility Strong sting; will severely burn neighboring sessile animals.

There are no anemonefishes in the Caribbean, but commensal crustaceans, such as *Thor amboinensis* shrimp and *Mitrax* crabs, do find protection with these small carpet-type anemones. Relatively hardy.



Cnidaria; Anthozoa; Actiniaria; Stichodactylidae

Saddle Anemone ***Stichodactyla haddoni***

30-50 cm (11.7-19.5 in.) across Indo-Pacific

- **Lighting** Contains symbiotic algae and need bright lighting.
- **Water Quality** Needs long acclimation and perfect water quality.
- **Compatibility** Has a strong sting and can harm sessile animals.
- **Feeding** Carnivore that needs regular meals of high-quality meaty foods.

A large, beautiful anemone, but not for beginners. More sensitive to water quality than other host sea anemones. Color morphs may be gray, light green, striped, bright green, or reddish orange.

Cnidaria; Anthozoa; Actiniaria; Stichodactylidae

Giant Carpet Anemone ***Stichodactyla gigantea***

15-50 cm (5.9-19.5 in.) Indo-Pacific

- **Lighting** Contains symbiotic algae and requires strong lighting.
- **Circulation** Should be given moderate to strong water motion.
- **Compatibility** Has a strong sting and will severely burn neighboring sessile animals.
- **Feeding** Needs regular meals of high-quality meaty foods.

Hardy under the right conditions, but needs special care during acclimation. Variable colors: from yellow to brown and green to purple. Best kept in a species tank with *Amphiprion* spp. clownfishes.

Cnidaria; Anthozoa; Actiniaria; Phymanthidae

Sand Anemone ***Phymanthus* sp.**

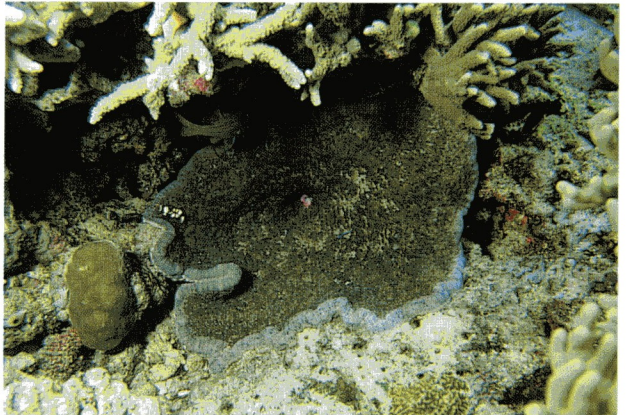
10-15 cm (3.9-5.9 in.) across Indo-Pacific

Lighting Contains symbiotic algae and needs high light intensity.

Aquascaping Prefers sandy habitats; this genus is well-suited to small tanks and sand-zone aquariums.

Compatibility A perfect anemone to combine with corals, commensal shrimps, and other sessile animals in a community tank.

Small, easy to keep, and an excellent host for symbiotic crabs and shrimps. Disc is usually greenish or brownish. Tentacles are long with many treelike outgrowths situated only along the periphery of the disc.



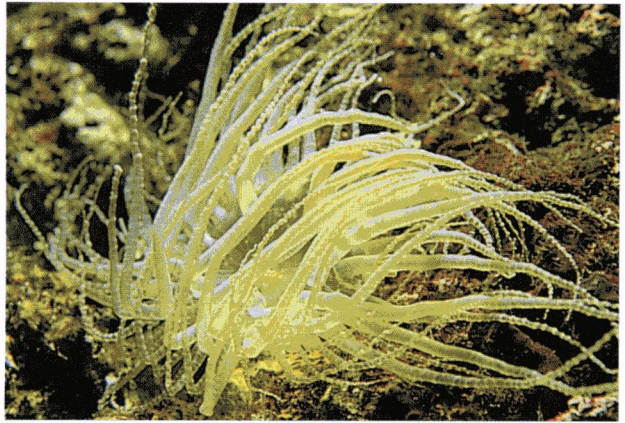
Cnidaria; Anthozoa; Actiniaria; Thalassianthidae

Pizza Anemone ***Cryptodendrum adhaesivum***

To 30 cm (11.7 in.) across Indo-Pacific

- **Lighting** Contains symbiotic algae and needs intense lighting.
- **Feeding** Carnivore that needs plankton and meaty marine foods, such as pieces of shrimp or squid and live adult brine shrimp.
- **Compatibility** Extremely "sticky" and a deadly threat to sessile animals it touches. Can kill fishes and corals.
- **Hazards** Sting is painful to most humans. Handle with gloves.

Hardy and handsome, this anemone is a potent hazard in most aquariums and is best kept in its own display system.



Cnidaria; Anthozoa; Actiniaria; Aiptasidae

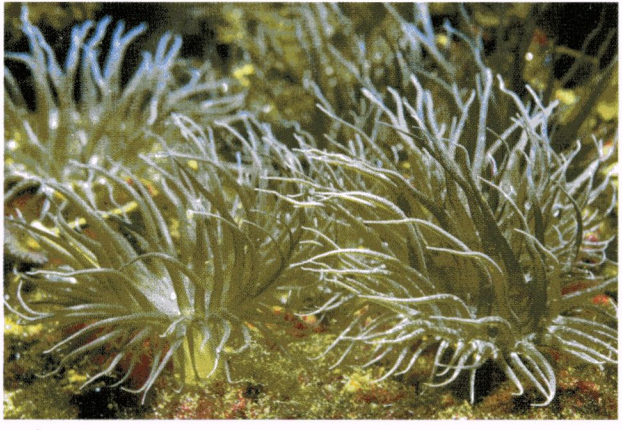
Curleycue Anemone ***Bartholomea annulata***

To 30 cm (11.7 in.) across Caribbean

Lighting Contains symbiotic algae and needs high light intensity.

Compatibility Has strong stinging cells and will burn neighboring sessile animals severely.

A common and hardy anemone with knobby, nearly transparent tentacles. It is a good candidate for a small biotope aquarium where the animal can serve as host for its many natural symbiotic shrimps and crabs.



Cnidaria; Anthozoa; Actiniaria; Aiptasidae

Glassrose, "Aiptasia" ***Aiptasia* sp.**

To 6 cm (2.3 in.) tall Tropical and subtropical seas

■ **Compatibility** Multiplies asexually very quickly, building huge populations in aquariums. Has a nasty stinging ability and the potential to overgrow an aquarium completely, killing many other sessile inhabitants.

This is one of several similar-looking species of small, nuisance anemones. Must be regarded as a pest and should be avoided—or removed promptly if it invades a reef aquarium. Grows under many different conditions and very difficult to control.

Cnidaria; Anthozoa; Actiniaria; Actiniidae

"Anemonia" ***Anemonia* cf. *majano***

To 3 cm (1.2 in.) in diameter Indo-Pacific

Lighting Has symbiotic algae and thrives in strong light intensity.

Compatibility Appealing when it first appears on live rock, this tiny anemone can reproduce wildly and overgrow the aquarium completely, crowding out desirable corals and sessile invertebrates.

These pests can be introduced into the reef aquarium with live rock. They are hard—if not impossible—to control and remove once they are established. Some aquarists have used butterflyfishes as a biological control, with limited success.

Cnidaria; Anthozoa; Zoanthidea; Zoanthidae

Button polyps ***Protopalythoa* spp.**

Small to medium-sized colonies Tropical seas

Lighting Contain symbiotic algae and need medium to strong light intensity.

Feeding Do not require intentional feeding.

Many different species occur in the trade, and most are hardy and a nice addition to the reef aquarium. Many colors, green and brown being the most common. Hardy and easy to keep. They are often fast growing and bud off new individuals asexually, spreading the colony.

Cnidaria; Anthozoa; Zoanthidea; Zoanthidae

Sea mats, button polyps — ***Zoanthus* spp.**

Medium-sized colonies — Tropical seas

Lighting Usually found in shallow water and require high light intensity.

Feeding Do not require feeding. Some species, however, will respond to occasional meaty offerings, such as live brine shrimp.

Although difficult to identify, the various zoanthids are generally hardy and easy to keep. They reproduce asexually in the aquarium, expanding over the hard substrate to form lovely mats.

Cnidaria; Anthozoa; Zoanthidea

Yellow zoanthid **Not yet described**

Small to medium-sized colonies Indo-Pacific

Lighting Contains symbiotic algae and should be given moderate to strong light intensity.

Compatibility Has a moderately damaging sting and the potential to multiply and overtake large areas of an aquarium.

Its beautiful bright yellow color and rapid growth makes this colonial polyp a perfect animal for the reef aquarium. Hardy and easy to keep. Has been sold since the early 1970s as "*Parazoanthus gracilis*." This name is definitely wrong and its identity remains unknown.

Cnidaria; Anthozoa; Zoanthidea; Zoanthidae

Worm tube zoanthid ***Acrozoanthus* sp**

Small to medium-sized colonies Indo-Pacifi

■ **Compatibility** Part of a unique symbiotic relationship. Probabl both partners are necessary for successful keeping.

■ **Conservation** Should not be imported until more is known abou its husbandry.

These polyps live with tube-dwelling bristleworms from the genu *Eunice* by attaching themselves to the upper part of the worm tubes which are normally cut off during collection. The polyps seem unabl to live on any other substrate and are hard if not impossible to keep.

Cnidaria; Anthozoa; Zoanthidea; Zoanthidae

Sea mats

***Palythoa* spp.**

Medium-sized to large colonies

Tropical seas

Lighting Photosynthetic; need moderate to high light intensity.

Hazards Symbiotic bacteria living with *Palythoa* spp. produce palytoxin, a potent toxin in the mucus. Handle with care—gloves are recommended.

These easily kept polyps are connected by fleshy tissue that encrusts the substrate. They often form large colonies in shallow water. Colors are usually yellowish or brownish.

Cnidaria; Anthozoa; Zoanthidea; Zoanthidae

Snake polyps ***Isaurus* sp.**

Medium-sized colonies Indo-Pacific

Lighting Probably needs moderate light intensity.

Feeding Should be given minute plankton during the night when the polyps are open.

These nocturnal polyps usually refuse to open during the day and are difficult to feed and keep. Little is known about their requirements in the aquarium. The stems of their long polyps are usually covered with large tubercles.

Cnidaria; Anthozoa; Corallimorpharia; Ricordeidae

Florida False Coral — ***Ricordea florida***

To 8 cm (3.1 in.) across — Caribbean

Lighting Contains symbiotic algae but does best in medium light intensity.

Feeding Carnivorous and should be fed from time to time, which will increase its budding potential.

Relatively easy to keep and perfect for a Caribbean aquarium or Gulf of Mexico biotope. Usually found in dense colonies as a result of asexual reproduction. Usually greenish, but sometimes orange or pink.

Cnidaria; Anthozoa; Corallimorpharia; Discosomatidae

Large Elephant Ear ***Amplexidiscus fenestrafer***

20-45 cm (7.8-17.6 in.) across Indo-Pacific

Lighting Contains symbiotic algae, but like most mushroom anemones, seems to do best with moderate light intensities.

Aquascaping Needs plenty of space.

Feeding Carnivorous and should regularly be fed meaty foods.

Compatibility Has the potential to capture crustaceans and small fishes by ensnaring them in a balloonlike trap.

This mushroom anemone grows large and is not difficult to keep, but is responsible for catching and eating many prized aquarium fishes.

Cnidaria; Anthozoa; Corallimorpharia; Discosomatidae

Mushroom anemone ***Discosoma* sp. A**

To 6 cm (2.3 in.) across Indo-Pacific

■ **Lighting** Contains symbiotic algae, but most mushroom anemones seem to do best with moderate light intensities.

■ **Compatibility** These mushroom anemones can bud rapidly and have the potential to form large, dominant colonies.

These beautiful solitary polyps are hardy and easily recommended to beginning reef aquarists. The blue, green, striped, or red colors may reflect different species, but are probably color morphs of one or a few species. Bright light may cause them to lose color.

Cnidaria; Anthozoa; Corallimorpharia; Discosomatidae

Mushroom anemone ***Discosoma* sp. B**

To 10 cm (3.9 in.) across Indo-Pacific

■ **Lighting** Contains symbiotic algae, but most mushroom anemones seem to do best with moderate light intensities.

■ **Compatibility** These mushroom anemones can bud rapidly and have the potential to form large, dominant colonies.

Easy to keep but even experts find them difficult to identify. Discs have many rudimentary tentacles, and the colors are usually brownish or greenish. Good for lower regions of a reef tank.

Cnidaria; Anthozoa; Corallimorpharia; Discosomatidae

Hairy Mushroom Anemone ***Rhodactis indosinensis***

To 11 cm (4.3 in.) across Indo-Pacific

Lighting Does contain symbiotic algae and seems to thrive in bright light intensities, although moderate lighting will suffice.

Compatibility These mushroom anemones can bud rapidly and have the potential to overgrow large portions of the aquascape.

There are many similar species in this easy to keep genus. Disc is brown and covered with prominent branched tentacles.

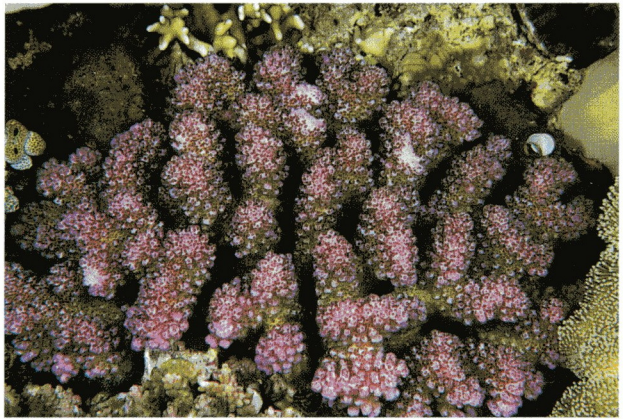
Cnidaria; Anthozoa; Scleractinia; Pocilloporidae

Birdsnest Coral ***Pocillopora damicornis***

Medium-sized colonies Indo-Pacific

- **Lighting** Photosynthetic; needs high-intensity lighting.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

Grows fast in the reef aquarium and is easy to keep and propagate, making it a favorite of hobbyists and researchers alike. Highly variable branch and colony shape, depending on the habitat. Can form large stands in captivity.



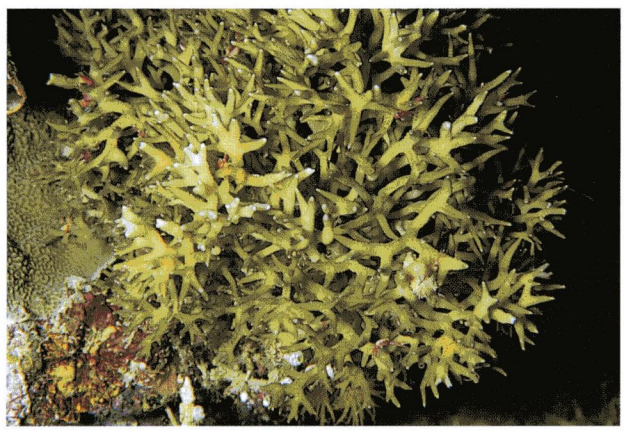
Cnidaria; Anthozoa; Scleractinia; Pocilloporidae

Warty Bush Coral ***Pocillopora verrucosa***

Medium-sized colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs high-intensity lighting.
- **Circulation** Requires strong water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

Not as easy to keep as *P. damicornis* (above), but generally a hardy species that grows well and can be propagated asexually by cuttings. Usually brownish, but sometimes pink or red.



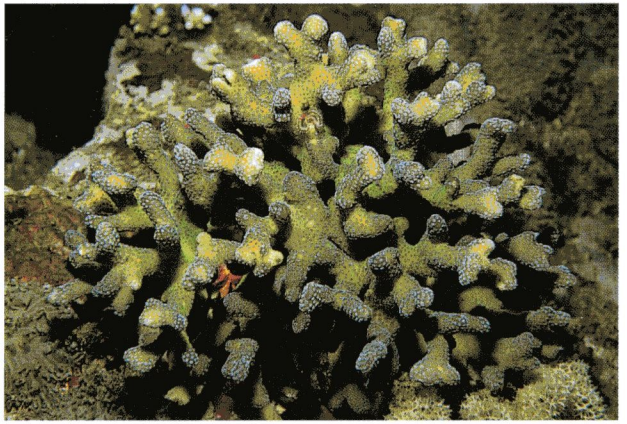
Cnidaria; Anthozoa; Scleractinia; Pocilloporidae

Thorny Bush Coral ***Seriatopora hystrix***

Small to medium-sized colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs high-intensity lighting.
- **Circulation** Requires strong water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

With its needle-sharp branches, this is a distinctive coral but delicate and sensitive to being overgrown by algae. The branches break easily. Usually pale brownish, occasionally pink.



Cnidaria; Anthozoa; Scleractinia; Pocilloporidae

Cat's Paw, Club Finger Coral ***Stylophora pistillata***

Medium-sized colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs high-intensity lighting.
- **Circulation** Requires strong water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

Hardy and relatively easy to keep and propagate by cuttings. Forms a variety of colony shapes, depending on lighting and current conditions. Usually yellow or green, occasionally pink.

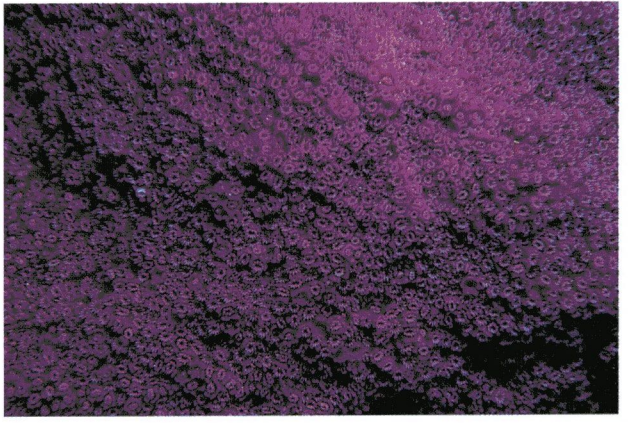
Cnidaria; Anthozoa; Scleractinia; Acroporidae

Cabbage corals, velvet corals ***Montipora* spp.**

Small to very large colonies Indo-Pacific

- **Lighting** Contain symbiotic algae and need high-intensity lighting.
- **Circulation** Require strong water movement.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.

This hardy genus has many encrusting species, but can also form branches, plates, and whorling vase shapes. The polyps are small and live in "open" corallites. Occasionally arrives on live rock.



Cnidaria; Anthozoa; Scleractinia; Acroporidae

Pearled Staghorn Coral ***Acropora gemmifera***

Medium-sized colonies Indo-Pacific

- **Lighting** Photosynthetic; needs high-intensity lighting.
- **Circulation** Requires strong, surging water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

Among the more demanding species in the genus to sustain in captivity and recommended for experts only. The colonies form heavy, clustering (corymbose) plates with thick, tapering branches. A variety of colors from pale yellow and whitish to bright pink.

Cnidaria; Anthozoa; Scleractinia; Acroporidae

Staghorn Coral ***Acropora formosa***

Medium-sized to very large colonies Indo-Pacific

- **Lighting** Photosynthetic; needs high-intensity lighting.
- **Circulation** Requires strong water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

The classic "beginner's *Acropora*"—fast growing and easy to keep. This species is referred to as *A muricata* by some. Usually brownish with colorful branch tips.

Cnidaria; Anthozoa; Scleractinia; Acroporidae

Table corals ***Acropora* spp.**

Form large colonies Indo-Pacific

- **Lighting** Photosynthetic; need high-intensity lighting.
- **Circulation** Require strong water movement.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.
- **Aquascaping** Need plenty of space; should be affixed to form coral tiers in the water column. Will expand to shade other corals.

With good conditions, many of the table-shaped *Acropora* grow extraordinarily fast and are relatively easy to keep and propagate.

A colony of *Acropora millepora*, a beautiful species of staghorn coral, thrives in shallow, nutrient-poor waters of the Coral Sea. Cloudy water impedes stony coral growth, and high levels of dissolved nutrients would allow algae to proliferate and choke out such corals.

Cnidaria; Anthozoa; Scleractinia; Acroporidae

Bushy Acropora ***Acropora elseyi***

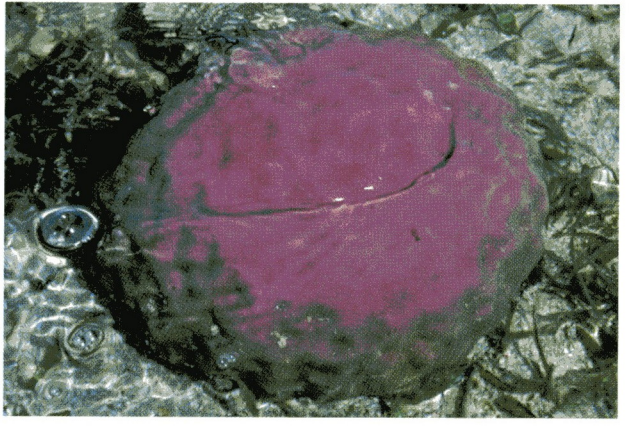
Medium-sized to very large colonies Indo-Pacific

Lighting Contains symbiotic algae and needs high-intensity lighting.

Circulation Requires strong water movement.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

This species can form huge stands in protected habitats in the wild. Relatively easy to keep and to propagate by cuttings. Usually brown with interesting, subdividing branches covered with branchlets.



Cnidaria; Anthozoa; Scleractinia; Poritidae

Jewel stone corals — ***Porites* spp.**

Small to very large colonies — Tropical seas

- **Lighting** Photosynthetic; need high-intensity lighting.
- **Circulation** Requires strong water movement.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.

This genus has many forms—encrusting, mounding, plating, and branching—that typically grow slowly but are hardy in the aquarium. Similar to *Montipora* spp., but corallites are filled with spines and septa.

Cnidaria; Anthozoa; Scleractinia; Poritidae

Daisy coral

***Goniopora* sp.**

Medium-sized colonies

Indo-Pacific

Lighting Contains symbiotic algae and needs medium to strong light intensity.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

Feeding Difficult to feed. Dissolved organic nutrients are likely important for these corals, but their needs are still poorly understood.

Long-term survival is unusual. Often declines gradually, with polyps refusing to open completely and tissue slowly receding.

Cnidaria; Anthozoa; Scleractinia; Agariciidae

Lettuce Coral ***Pavona cactus***

Medium-sized colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs high-intensity lighting.
- **Circulation** Requires strong water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

The foliaceous, twisted, and thin branches are fragile but give the species a distinct appearance. Easy to keep and propagate by taking cuttings. Color is often pale brown or yellowish.

Cnidaria; Anthozoa; Scleractinia; Fungiidae

Anemone Mushroom Coral ***Heliofungia actiniformis***

Huge solitary polyp Central Pacific

- **Lighting** Photosynthetic—needs medium to strong lighting.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.
- **Aquascaping** Should be on a quiet sandy bottom where it can expand freely. Keep away from strong currents.

Resembles an anemone, but is a solitary (single polyp) stony coral. Often damaged in collection or shipping, but is hardy once established. Needs very careful acclimation.

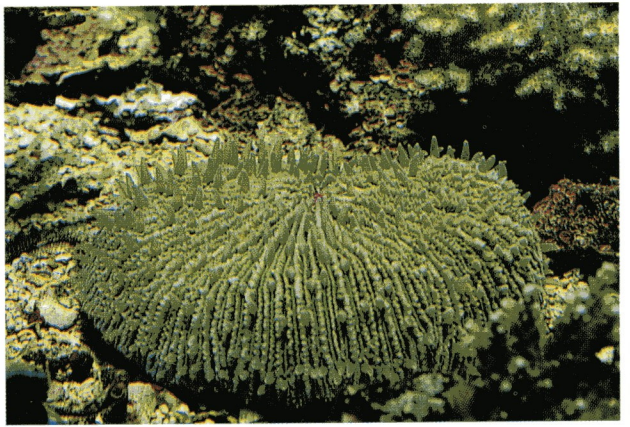
Cnidaria; Anthozoa; Scleractinia; Fungiidae

Plate corals, mushroom corals ***Fungia* spp.**

14-30 cm (5.5-11.7 in.) across Indo-Pacific

- **Lighting** Photosynthetic—need medium to strong lighting.
- **Aquascaping** Should be kept on a flat bottom with sand or rubble.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.

Showy specimens that are typically hardy and long-lived. Often greenish, but other colors are seen. This genus has separate sexes, and spawning in captivity is not uncommon.



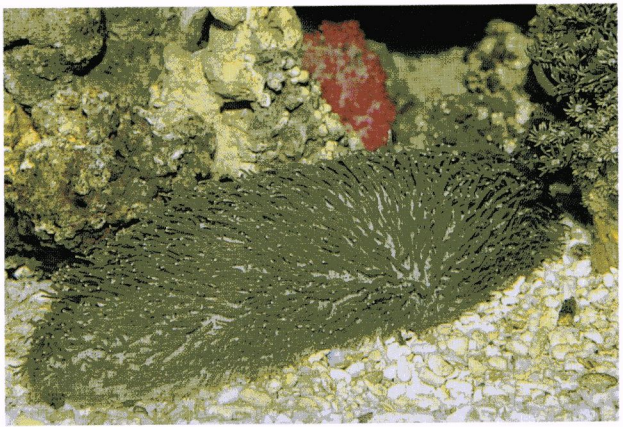
Cnidaria; Anthozoa; Scleractinia; Fungiidae

Slipper Coral ***Polyphyllia talpina***

Small, elongated colonies Indo-Pacific

- **Lighting** Photosynthetic—needs medium to strong lighting.
- **Aquascaping** Should be kept on a flat bottom with sand or rubble.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

Easy to keep and grow and can live for many years in captivity. Elongated colony with a distinct axial furrow and long, pointed tentacles.



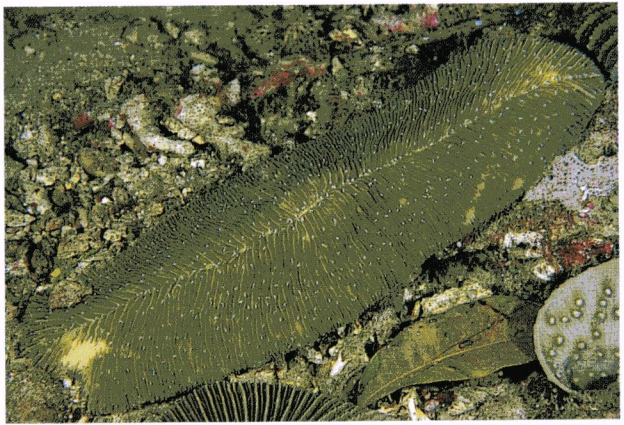
Cnidaria; Anthozoa; Scleractinia; Fungiidae

Tongue Coral ***Herpolitha limax***

To 50 cm (19.5 in.) Indo-Pacific

- **Lighting** Photosynthetic—needs medium to strong lighting.
- **Aquascaping** Should be kept on a flat bottom with sand or rubble.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

Hardy and easy to keep. Grows well and can live for many years in captivity. Each specimen has several mouth openings and long, pointed tentacles. Colors are normally green or light brown to yellow.



Cnidaria; Anthozoa; Scleractinia; Oculinidae

Crystal Coral ***Galaxea fascicularis***

Medium-sized to large colonies Indo-Pacific

Lighting Photosynthetic but accepts moderate light intensities.

Circulation Requires strong water movement.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

Compatibility Can expose long sweeper tentacles with a powerful sting and needs sufficient distance from neighboring corals.

In favorable conditions, a hardy, fast growing, and easy to keep stony coral. Better suited to larger aquariums with space for it to expand.

Cnidaria; Anthozoa; Scleractinia; Pectiniidae

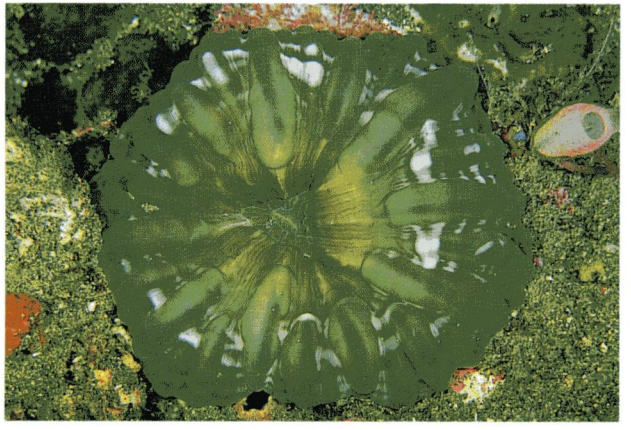
Palm Lettuce Coral ***Pectinia paeonia***

Medium-sized colonies Indo-Pacific

Lighting Contains symbiotic algae and needs high-intensity lighting.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

This unusual coral is not difficult to keep and has thin, irregular, upward projecting plates and spires. Colors are subtle but appealing in brown, green, or gray.



Cnidaria; Anthozoa; Scleractinia; Mussidae

Button Coral ***Cynarina lacrymalis***

5-30 cm (2-11.7 in.) across Indo-Pacific

Lighting Contains symbiotic algae, but does best in moderate and even dim lighting.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

Aquascaping Best kept flat on the bottom of the aquarium, away from the bright light at the surface.

A beautiful curiosity, generally hardy and easy to keep. Becomes huge when fully inflated and needs plenty of space.

Cnidaria; Anthozoa; Scleractinia; Mussidae

Pineapple Coral ***Blastomussa wellsi***

Medium-sized colonies Indo-Pacific

Lighting Contains symbiotic algae but does best in subdued or indirect lighting.

Circulation Prefers locations with quiet water conditions.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

Somewhat uncommon, this is a beautiful, hardy coral with large, robust corallites. Normally bright red in color, sometimes with fluorescent green highlights.

Cnidaria; Anthozoa; Scleractinia; Mussidae

Meat Coral ***Lobophyllia hemprichii***

Medium-sized colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs high-intensity lighting.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.
- **Feeding** Needs meaty foods 1-2 times weekly to thrive.

This is an impressive, heavy-bodied coral with large polyps, but not difficult to keep. Colors vary widely, often greenish or brownish. Seems to prefer calm water conditions.

Cnidaria; Anthozoa; Scleractinia; Merulinidae

Horn Coral ***Hydnophora exesa***

Medium-sized to large colonies Indo-Pacific

- **Lighting** Contains symbiotic algae and needs high-intensity lighting.
- **Circulation** Requires moderately strong water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

Fluorescent green colonies are very eye-catching, but this is not among the easiest stony corals to keep. Growth form may be branching, massive, or encrusting. Some aquarium keepers offer meaty foods.

Cnidaria; Anthozoa; Scleractinia; Faviidae

Trumpet Coral ***Caulastrea furcata***

Medium-sized to large colonies Indo-Pacific

Lighting Contains symbiotic algae but does best with moderate light intensity.

Aquascaping Common in calm areas with clear water, especially on sand, and therefore excellent in a sandy lagoon aquarium.

Water Quality Like all stony corals it needs excellent water quality, including calcium for building the calcareous skeleton.

Spectacular colonies are easy to keep. Grows quickly by polyp division. New colonies can be created by taking fragments or cuttings.

Cnidaria; Anthozoa; Scleractinia; Faviidae

Moon corals ***Favia* spp.**

Small to large colonies Indo-Pacific

- **Lighting** Contain symbiotic algae and need medium- to high-intensity lighting.
- **Circulation** Require moderate water movement.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.

These massive, flat or dome-shaped corals are not difficult to keep, although they grow slowly. They may respond well to occasional feeding at night, when the feeding tentacles are extended.

Cnidaria; Anthozoa; Scleractinia; Faviidae

Moon corals — ***Favites* spp.**

Medium-sized to large colonies — Indo-Pacific

- **Lighting** Contain symbiotic algae and need medium- to high-intensity lighting.
- **Circulation** Require moderate water movement.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.

Most species are hardy and easy to keep. Similar to *Favia* spp., except that adjoining polyps share a common wall, which gives many *Favites* species a honeycomb appearance.

Cnidaria; Anthozoa; Scleractinia; Faviidae

Honeycomb corals — ***Goniastrea* spp.**

Small to large colonies — Indo-Pacific

- **Lighting** Photosynthetic; need high-intensity lighting.
- **Circulation** Require moderate water movement.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.

These rugged corals are normally found on inshore reefs and reef flats, often exposed to open air during low tide and therefore excellent in a tidal aquarium. Very hardy and easy to keep. Massive colonies are usually cream or pale brown, sometimes greenish.

Cnidaria; Anthozoa; Scleractinia; Faviidae

Boulder corals, moon corals ***Montastraea* spp.**

Small to large colonies Circumtropical

- **Lighting** Photosynthetic; need high-intensity lighting.
- **Circulation** Require moderate water movement.
- **Water Quality** Demand excellent water quality, including calcium supplementation for skeletal growth.

Hardy corals that form massive colonies, flat or dome-shaped. Some species create large boulders in the wild. Polyps open to feed during the night when sweeper tentacles may be observed.

Cnidaria; Anthozoa; Scleractinia; Trachyphylliidae

Open Brain Coral ***Trachyphyllia geoffroyi***

To 20 cm (7.8 in.) across Indo-Pacific

- **Lighting** Contains symbiotic algae and needs moderate- to high-intensity lighting.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.
- **Feeding** Responds well to occasional meals of meaty foods.

With large, fleshy polyps, this is one of the most distinctive and oldest species of stony corals in the aquarium hobby. Generally hardy, but sensitive to green algae invading the skeleton.

Cnidaria; Anthozoa; Scleractinia; Caryophylliidae

Anchor Coral ***Euphyllia ancora***

Medium to large Indo-Pacific

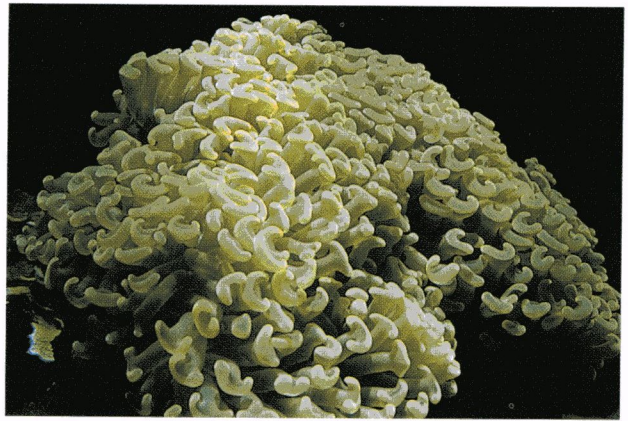
Lighting Photosynthetic—needs medium- to high-intensity light.

Circulation Requires moderate water movement.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

Hazards Has a powerful sting; aquarists have experienced allergic reactions to this coral, and it will harm nearby corals in the reef.

Attractive and interesting species that is moderately easy to keep. Sensitive to green algae invading the skeleton. Needs plenty of space.



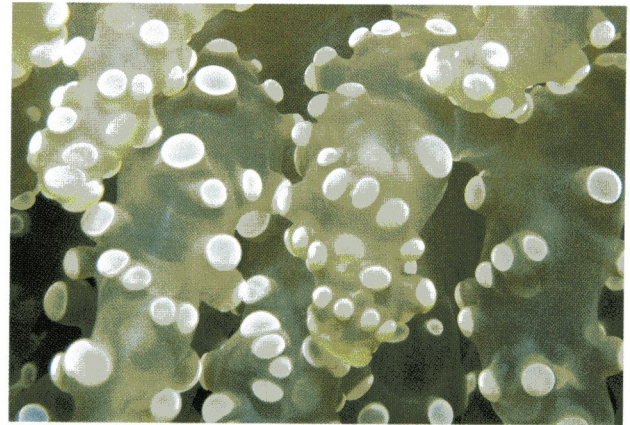
Cnidaria; Anthozoa; Scleractinia; Caryophylliidae

Frogspawn Coral ***Euphyllia divisa***

Medium-sized to large colonies Indo-Pacific

- **Lighting** Photosynthetic—needs medium- to high-intensity light.
- **Circulation** Requires moderate water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.
- **Compatibility** As with other *Euphyllia* species,it has sweeper tentacles and can attack and harm other corals within its reach.

A hardy coral that grows fast and is generally easy to keep. The sexes are separate. Needs plenty of space to expand and grow.



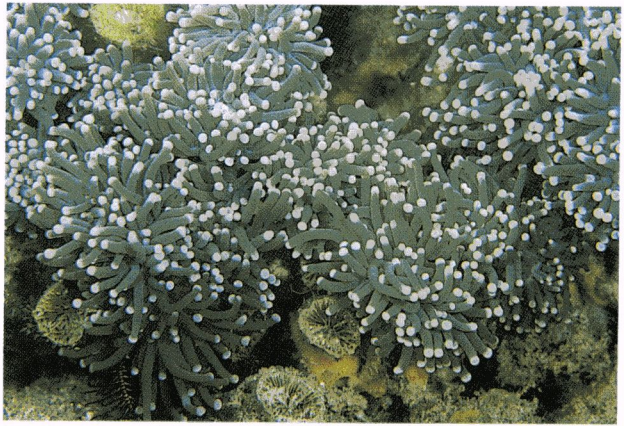
Cnidaria; Anthozoa; Scleractinia; Caryophylliidae

Torch Coral ***Euphyllia glabrescens***

Medium-sized colonies Indo-Pacific

- **Lighting** Photosynthetic—needs medium- to high-intensity light.
- **Circulation** Requires moderate water movement.
- **Water Quality** Demands excellent water quality, including calcium supplementation for skeletal growth.

More demanding than the other *Euphyllia* spp. and subject to shipping damage and "brown jelly" infections. Individual branches may die, while others survive. Typical of this genus, the coral will not extend its polyps fully unless aquarium conditions are right.



Cnidaria; Anthozoa; Scleractinia; Caryophylliidae

Elegance Coral ***Catalaphyllia jardinei***

To 50 cm (19.5 in.) across Indo-Pacific

Lighting Photosynthetic; needs medium to strong light intensity.

Water Quality Like all stony corals it needs excellent water quality, including calcium for building the calcareous skeleton.

Aquascaping Occurs in turbid water, often on muddy or sandy bottoms or among seagrass, and is best kept in similar habitats—placed in soft substrate and not wedged among live rocks.

Often a centerpiece coral, growing large and beautiful. Usually easy to keep, but sometimes prone to unexplained demise.

Cnidaria; Anthozoa; Scleractinia; Caryophylliidae

Bubble Coral ***Plerogyra sinuosa***

To 1 m (3.3 ft.) across Indo-Pacific

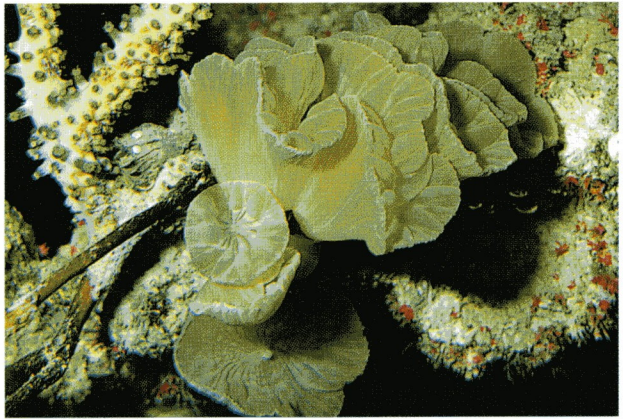
Lighting Photosynthetic, needs medium to strong light intensity.

Water Quality Demands excellent water quality, including calcium supplementation for skeletal growth.

Feeding Responds well to occasional meals of meaty foods offered at night when its feeding tentacles are extended.

Compatibility Will sting other corals within its reach.

A favorite coral that is long-lived in many reef aquariums. Easy to keep, but the skeleton is sensitive to becoming invaded by green algae.



Cnidaria; Anthozoa; Scleractinia; Caryophylliidae

Fox Coral ***Nemenzophyllia turbid***

Small to medium-sized colonies Central Pacifi

Lighting Photosynthetic— does best under moderate lighting.

Aquascaping Occurs in turbid water, often on muddy or sandy bo toms or among seagrass, and its best kept in similar habitats.

Water Quality Like all stony corals it needs excellent water qua ity, including calcium for building the calcareous skeleton.

Some aquarists consider this a challenging coral, while others b lieve it is hardy and not difficult to keep. May do best in a seagras biotope aquarium or a system without aggressive skimming.

Cnidaria; Anthozoa; Scleractinia; Dendrophylliidae

Orange cup corals ***Tubastraea* spp.**

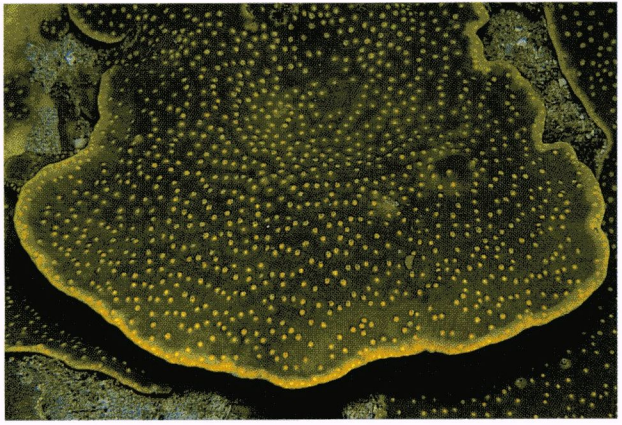
Usually less than 20 cm (7.8 in.) across — Tropical Seas

Lighting Do not contain symbiotic algae—do best in low light intensity locations, even under overhangs or in caves.

Circulation Need strong alternating water motion.

Feeding Must be fed regularly with frozen and living foods such as enriched *Artemia*, *Mysis* shrimp, and the like.

Exceptionally beautiful but very demanding to feed and keep alive. Easier to keep in a small, dedicated tank where they can be hand fed easily. For experienced and advanced aquarists only.



Cnidaria; Anthozoa; Scleractinia; Dendrophylliidae

Scroll Coral ***Turbinaria reniformis***

Medium-sized to very large colonies Indo-Pacific

- **Lighting** Photosynthetic—needs medium to strong light intensity.
- **Circulation** Requires moderate to strong water movement.
- **Water Quality** Like all stony corals it needs excellent water quality, including calcium for building the calcareous skeleton.

Hardy and easy to keep, but needs a lot of space to grow. May require a regular blast of water current to flush out detritus that may tend to accumulate in the cup or scrolls of the colony.

Cnidaria; Anthozoa; Scleractinia; Dendrophylliidae

Scroll Coral, Turban Coral ***Turbinaria peltata***

Medium-sized colonies Indo-Pacific

- **Lighting** Photosynthetic; needs medium to strong light intensity.
- **Circulation** Requires moderate to strong water movement.
- **Water Quality** Like all stony corals it needs excellent water quality, including calcium for building the calcareous skeleton.

Forming either flat plates, cups, or upright columns, this is a variable but hardy and interesting coral. May require a regular blast of water current to flush out detritus that may tend to accumulate in the cup of the colony.

Mollusca; Polyplacophora; Neoloricata; Chitonidae

Chitons ***Acanthopleura* spp.**

To 10 cm (3.9 in.) Tropical seas

- **Aquascaping** These chitons live in tidal zones, such as on beach rocks, and are highly appropriate for a marine aqua-terrarium biotope. They attach themselves very firmly to rocky substrates and can tolerate strong wave action.
- **Feeding** No intentional feeding necessary. Graze on algal films.
- **Compatibility** Usually reef safe.

A well-armored mollusk that may arrive on live rock. Long-lived if conditions and food are right.

Mollusca; Gastropoda; Prosobranchia; Neritimorpha; Neritidae

Nerite Snail ***Nerita albicilla***

2.5 cm (1 in.) Indo-Pacific

- **Feeding** Grazes on algal films and microalgae only.
- **Compatibility** Reef safe.

One of a genus of pretty, rounded little snails that are familiar to beachcombers worldwide. Very common and usually found in the tidal zone, periodically living above the sea level. Good as algae grazers, although it may take many snails to perform effectively. Excellent for a tidal aquarium. Natural lifespan may be no more than a year.

Mollusca; Gastropoda; Prosobranchia; Archaeogastropoda; Fissurellidae

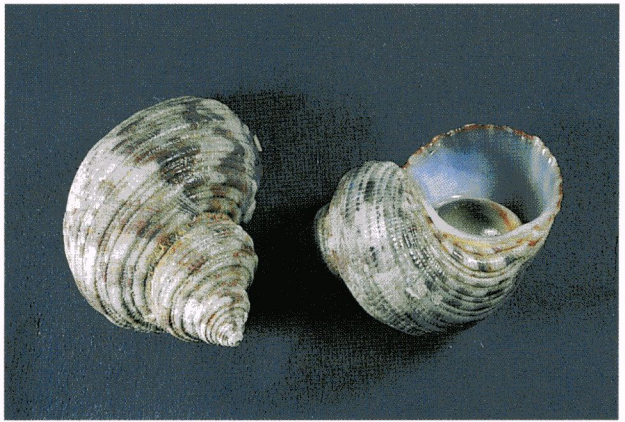
Shield Limpet ***Scutus unguis***

To 7 cm (2.7 in.) Indo-Pacific

Feeding Usually grazes on algal films and microalgae.

Compatibility Usually reef safe. Sometimes reported to feed on colonial tunicates and some corals, but survives easily in the reef aquarium and probably feeds on a variety of food and food remains. (The Caribbean keyhole limpets will aggressively graze on corals.)

Usually found beneath rocks in shallow reef zones. Occasionally arrives on live rock. Nocturnal and hardy.



Mollusca; Gastropoda; Prosobranchia; Archaeogastropoda; Turbinidae

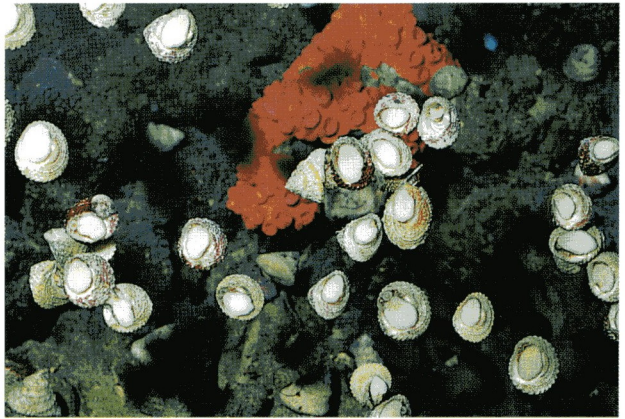
Green Turban Snail — ***Turbo brunneus***

To 5 cm (2 in.) high — Indo-Pacific

Feeding No intentional feeding necessary. Grazes on algal films, filamentous algae, diatoms, and cyanobacteria.

Compatibility Reef safe.

Usually found on shallow reefs among coral rubble and rocks where it can find sufficient microscopic algae. Often introduced to the aquarium on live rock. Short-lived; may starve if insufficient algae is present.



Mollusca; Gastropoda; Prosobranchia; Archaeogastropoda; Turbinidae

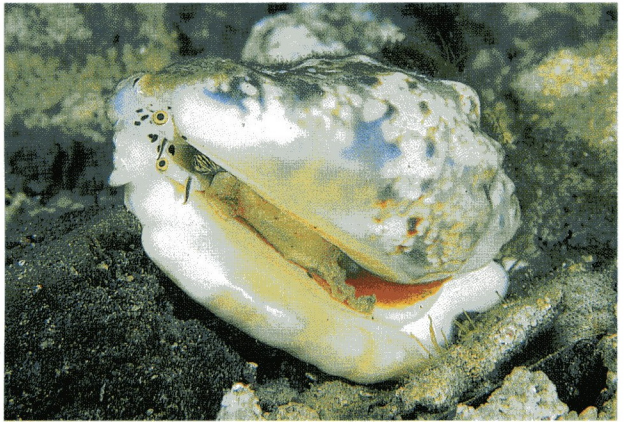
American Star Shell ***Astraea tecta***

To 5 cm (2 in.) high Caribbean

■ **Feeding** No intentional feeding necessary. Grazes on algal films, filamentous algae, diatoms, and cyanobacteria.

■ **Compatibility** Reef safe.

Some aquarists introduce one of these snails per gallon to control algae in a new reef aquarium. Relatively easy to keep, but generally short-lived—about a year in the aquarium.



Mollusca; Gastropoda; Prosobranchia; Neotaenioglossa; Strombidae

Queen Conch ***Strombus gigas***

To 30 cm (11.7 in.) Caribbean

Aquascaping A big snail best suited for a shallow-water biotope aquarium with room to graze.

Feeding Herbivorous, grazes on algae and seagrasses. Will need intentional feeding as it grows to larger sizes.

Overharvested for its meat and shells, this species is now being captive-bred, with small specimens available to aquarists. Not a good prospect for the reef tank, where it will get wedged in the rockwork.

Mollusca; Gastropoda; Prosobranchia; Neotaenioglossa; Strombidae

Spider conchs — ***Lambis* spp.**

To 35 cm (13.7 in.) — Indo-Pacific

Aquascaping These large snails are best suited for shallow-water biotope aquariums with room to graze. The spined shell is likely to become stuck in rock formations, and an open soft bottom is an appropriate habitat.

Feeding Herbivorous; feed on microscopic algae.

Strikingly beautiful shelled animals, but not among the easiest gastropods to keep. For advanced aquarists or specialized systems.

Mollusca; Gastropoda; Prosobranchia; Neotaenioglossa; Vermetidae

Small worm snails — ***Petaloconchus* spp.**

To 20 cm (7.8 in.) — Indo-Pacific

■ **Feeding** No intentional feeding necessary. Capture organic particles suspended in the water column, sometimes by secreting strings of mucus to snare nutrient-rich materials.

■ **Compatibility** Reef safe. May arrive on live rock; can develop large clusters of long calcareous tubes in aquariums without predators.

Known as vermetid gastropods, these snails secret calcareous tubes and have caplike opercula for protection. Hardy and long-lived.

Mollusca; Gastropoda; Prosobranchia; Neotaenioglossa; Vermetidae

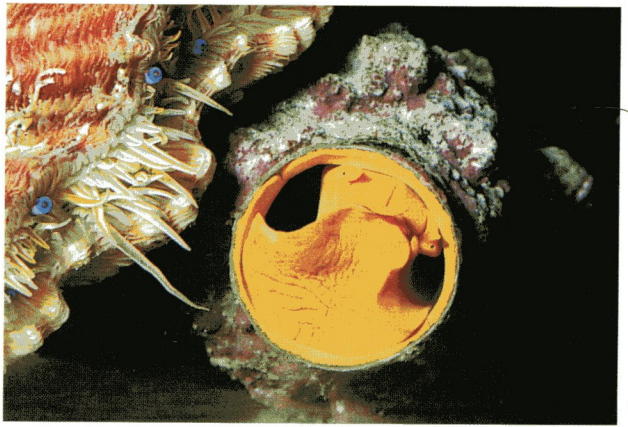
Big worm snails ***Serpulorbis* spp.**

To 2 cm (0.8 in.) across Tropical seas

Feeding Lives as a filter-feeder, screening organic particles from the water column. Needs a lot of particulate food.

Compatibility Reef safe. May arrive on live rock or embedded in stony corals.

Another genus of vermetid snails that sometime appear in reef aquariums. They are harmless, and a number of species are known. May be successfully kept in nutrient-rich aquariums.



Mollusca; Gastropoda; Prosobranchia; Neotaenioglossa; Cypraeidae

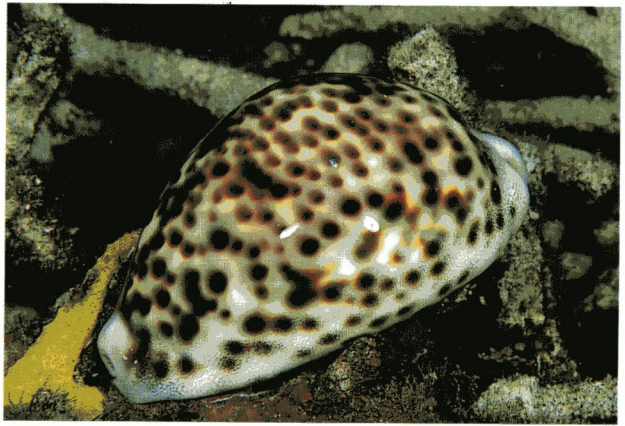
Tiger Cowrie — ***Cypraea tigris***

To 13 cm (5.1 in.) — Indo-Pacific

Feeding Omnivorous. Feeds on a variety of foods, including algae and meaty foods.

Compatibility Not reef safe. May attack other mollusks, corals, and fishes and will dislodge rocks and corals in its grazing activities.

Glisteningly beautiful when its shell is not covered by the mantle, this common cowrie is hardy but predatory.



Mollusca; Gastropoda; Prosobranchia; Neotaenioglossa; Cypraeidae

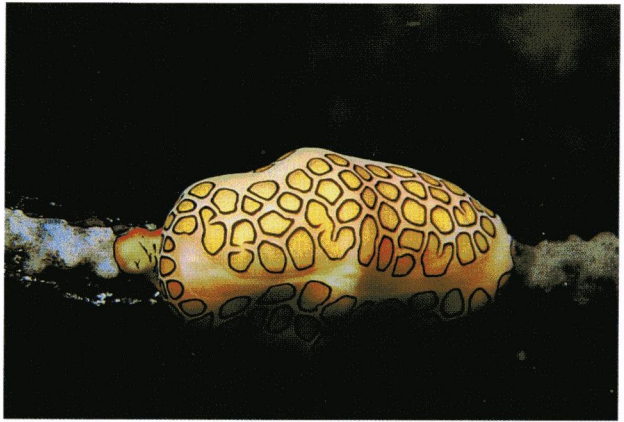
Money Cowrie ***Cypraea moneta***

To 3 cm (1.2 in.) Indo-Pacific

■ **Feeding** Herbivore. Can be used as an algae grazer in the aquarium, especially if stocked in high numbers.

■ **Compatibility** Reef safe. One of the few species in this genus of cowries that feeds on algae only.

Often imported, hardy, and easily kept. The lustrous shells of cowries once served as a medium of exchange for business transactions in tropical coastal societies, hence the common name.



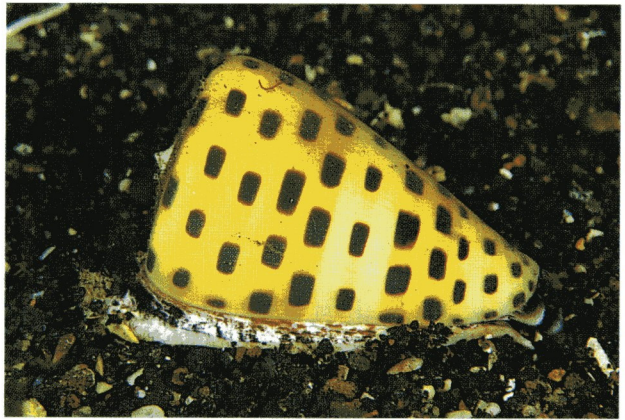
Mollusca; Gastropoda; Prosobranchia; Neotaenioglossa; Ovulidae

Flamingo Tongue — ***Cyphoma gibbosum***

To 2.5 cm (1 in.) — Caribbean

- **Feeding** Feeds exclusively on the polyps of photosynthetic gorgonians, which it will decimate in a typical home aquarium.
- **Compatibility** Not reef safe.
- **Conservation** Cannot be kept unless provided with live gorgonian polyps as food and should neither be collected nor purchased.

One of a genus of extraordinarily beautiful snails that are specialized feeders on live gorgonians.



Mollusca; Gastropoda; Prosobranchia; Neogastropoda; Conidae

Cone shells — ***Conus* spp.**

Normally less than 10 cm (3.9 in.) long — Indo-Pacific

■ **Compatibility** Most species eat bristleworms; some will kill and eat fishes. Need a specialized system of their own and expert care.

■ **Hazards** Some cone shells, e.g., *C. geographus* and *C. textile*, are extremely poisonous and their sting can even be fatal to humans.

Cone shells—some 300 species in total—are living works of art that deserve utmost respect. *Conus geographus* is the best-known species and has caused at least 12 fatalities among humans.

Mollusca; Gastropoda; Ophisthobranchia; Cephalaspidea; Aglajidae

Blue-striped Tailed Sea Slug ***Chelidonura varians***

To 5 cm (2 in.) Indo-Pacific

■ **Feeding** Very difficult to feed. In nature, it preys on small acoel flatworms like those in the genus *Convoluta*.

■ **Conservation** Will starve in most aquariums. Appropriate only for expert aquarists able to provide proper care and diet.

A strikingly colored sea slug that is virtually impossible to feed and keep. Would require a special aquarium with a soft bottom for grazing and a ready supply of the tiny flatworms that are its primary prey.

Mollusca; Gastropoda; Ophisthobranchia; Sacoglossa; Elysiidae

Ornate Sea Slug ***Elysia ornata***

To 5 cm (2 in.) in length Pantropical

Lighting Photosynthetic; requires brightly lit conditions.

Feeding Herbivore. Feeds on cell fluids from green algae of the genus *Bryopsis* only. Needs a peaceful aquarium with enough light and nutrients to support lush algal growth.

Conservation Doomed in most reef tanks because of its special way of feeding.

This attractive slug lives in shallow water and incorporates photosynthesizing chloroplasts from the algae it consumes into its own tissue.

Mollusca; Gastropoda; Ophisthobranchia; Sacoglossa; Elysiidae

Lettuce Sea Slug ***Elysia crispata***

To 10 cm (3.9 in) long Caribbean

- **Lighting** Photosynthetic; requires brightly lit conditions.
- **Feeding** Feeds on green algae in the genera *Caulerpa* and *Halimeda* as well as on brown *Sargassum* spp.
- **Compatibility** Reef safe, but will eat ornamental macroalgae.

A pretty species with highly variable colors that depend on the food eaten. Easier to keep than most other sea slugs but requires a special aquarium that supports lush algae growth. Has been bred in captivity. Formerly known as *Tridachia crispata*.

Mollusca; Gastropoda; Ophisthobranchia; Nudibranchia; Diodoridídae

Blue Sponge Nudibranch — ***Jorunna funebris***

To 10 cm (3.9 in.) in length — Indo-Pacific

■ **Feeding** Lives in association with the bright blue sponge *Haliclona* sp. and not known to take any other food.

■ **Conservation** Will starve in most aquariums. Suitable only for expert aquarists able to provide proper care and diet.

Like so many nudibranchs, this species is very distinctive in appearance but impossible to keep and should not be imported.

Mollusca; Gastropoda; Ophisthobranchia; Nudibranchia; Phyllididae

Warty Nudibranch — ***Phyllida varicosa***

To 11 cm (4.3 in.) in length — Indo-Pacific

- **Feeding** Carnivorous. Feeds exclusively on sponges and will not accept other foods in captivity.
- **Conservation** Will starve in most aquariums. Do not purchase.
- **Compatibility** Carries a deadly toxin that can wipe out a reef tank.

The most common of the about 70 spp. in the genus, this species is similar to the others in being nearly impossible to feed. It is also highly toxic and a threat to both fishes and invertebrates.

Mollusca; Gastropoda; Ophisthobranchia; Nudibranchia; Chromodoridae

Chromodorid nudibranchs — ***Chromodoris* spp.**

To about 5 cm (2 in.) in length — Distribution

- **Feeding** Prey only on certain species of sponges and will ignore all other foods in captivity.
- **Conservation** Will starve in most aquariums. Should neither be collected nor purchased.

This is one of a group of small and very colorful nudibranchs that are best viewed in the wild. They are may live for some months in captivity, but will eventually perish for lack of appropriate food.

Mollusca; Gastropoda; Ophisthobranchia; Nudibranchia; Hexabranchidae

Spanish Dancer ***Hexabranchus sanguineus***

To 60 cm (23 in.) in length Indo-Pacific

■ **Feeding** Cannot be sustained in a home aquarium. Feeds mainly on sponges, but also on tiny invertebrates like sea squirts, mollusks, and echinoderms.

■ **Conservation** Will starve in most aquariums. Do not purchase.

A stunning animal, often seen swimming with graceful movements that give it its common name. Will die shortly after being purchased and should not be caught, imported, or kept.

Mollusca; Gastropoda; Ophisthobranchia; Nudibranchia; Aeolidinia

Aiptasia-eating Nudibranch — ***Berghia verrucicornis***

Normally around 2 cm (5 in.) long — Caribbean

Feeding Feeds exclusively on glass anemones from the genus *Aiptasia*. Can be used as a predator in a tank infested with an uncontrolled population of *Aiptasia*.

Compatibility Reef safe. Will die if its food supply is eradicated.

A small, rather delicate nudibranch that is being tank-raised and sold as a biocontrol agent for nuisance *Aiptasia*. Short-lived. Careful acclimation needed.

Mollusca; Bivalvia; Mytiloida; Mytilidae

Green Mussel ***Mytilus smaragdinus***

To 6.5 cm (2.5 in.) long Western Pacific

Water Quality Lives in shallow, brackish coastal waters where the salinity is 20-30% and the temperature 20-28°C (68-82°F).

Feeding Filter feeder that extracts small organic particles and plankton from the water column. May need intentional feeding.

This brilliant bluish green mussel is an important source of food in Southeast Asia and sometimes appears in the aquarium trade. Difficult to keep in normal reef tanks where the salinity is too high for its long-term survival.

Mollusca; Bivalvia; Pteroidea; Pectiniidae

Caribbean Scallop ***Lyropecten nodosus***

To 15 cm (5.9 in.) across Caribbean; northern South America

■ **Feeding** Filter feeder that extracts small organic particles and plankton from the water column. Difficult to feed.

■ **Compatibility** Reef safe, but will do poorly in nutrient-poor, efficiently skimmed systems.

An interesting animal with long tentacles along its rim and numerous small, blue compound eyes. Difficult to keep. Needs a special aquarium where planktonic food can be provided on a regular basis.

Mollusca; Bivalvia; Pteroidea; Spondylidae

Variable Thorny Oyster ***Spondylus varius***

To 30 cm (11.7 in.) across Indo-Pacific

Lighting Should be placed in moderate to dim lighting.

Feeding A typical filter feeder that requires intentional feeding of suspended organic particles and microplankton.

Compatibility Reef safe, but will do poorly in nutrient-poor, efficiently skimmed systems.

With its showy mantle and blue compound eyes, this is an attractive bivalve. Unfortunately, it is difficult to keep well fed in a typical reef aquarium. Try a cave aquarium with strong currents.

Mollusca; Bivalvia; Pteroidea; Limidae

Rough Fileclam, Flame Scallop ***Lima scabra***

To 8 cm (3.1 in.) across Caribbean

■ **Aquascaping** Needs protected crevices where it can hide. Tends to be reclusive to avoid having fishes nibble at its tentacles.

■ **Feeding** A typical filter feeder that usually requires intentional feeding of suspended organic particles and microplankton.

■ **Compatibility** Reef safe, but will do poorly in nutrient-poor, efficiently skimmed systems. Best kept in a small system where it can be studied and fed properly.

Very appealing bivalve, but delicate and prone to staying hidden.

Mollusca; Bivalvia; Pteroidea; Limidae

File Shell ***Limaria orientalis***

To 5 cm (2 in.) across Indo-Pacific

Aquascaping Lives under rocks on sandy bottoms and requires a similar habitat in the aquarium.

Feeding A typical filter feeder that usually requires intentional feeding of suspended organic particles and microplankton.

Compatibility Reef safe, but will do poorly in nutrient-poor, efficiently skimmed systems.

An animal with flashy coloration, but very fragile and demanding of careful handling. Easily kept, but must be given a special aquarium.

Mollusca; Bivalvia; Veneroida; Tridacnidae

Smooth Giant Clam

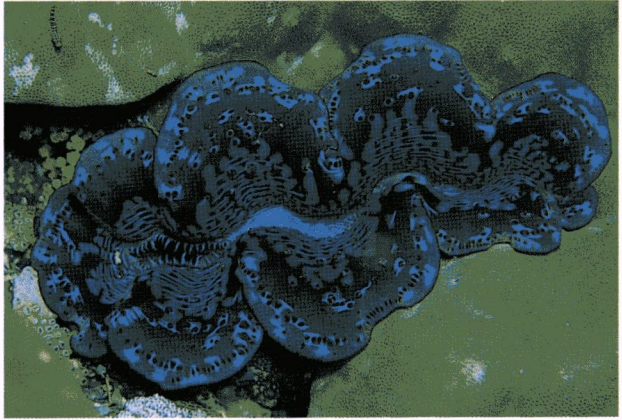
Tridacna derasa

To 50 cm (19.5 in.) long

Central Indo-Pacific

- **Lighting** Contains symbiotic algae and needs strong light intensity.
- **Water Quality** Like all giant clams, it needs excellent water quality, including calcium for building its calcareous shell.
- **Feeding** Photosynthetic; no intentional feeding necessary.

Generally regarded as the hardiest of the giant clams. Distinguished by its smooth shell. Found in exposed waters. Aquacultured specimens are readily available.



Mollusca; Bivalvia; Veneroida; Tridacnidae

Rugose Clam, Maxima Clam ***Tridacna maxima***

To 35 cm (13.7 in.) long Indo-Pacific; Red Sea

Lighting Contains symbiotic algae and needs strong light intensity.

Water Quality Like all giant clams, it needs excellent water quality, including calcium for building its calcareous shell.

Feeding Photosynthetic; no intentional feeding necessary.

Arguably the most colorful and spectacular of the *Tridacna* clams, this species also bores into the substrate, like *T. crocea* (bottom of page). Has prominent, widely spaced scutes (flutes) on its shell.

Mollusca; Bivalvia; Veneroida; Tridacnidae

Fluted Clam — ***Tridacna squamosa***

Tp 40 cm (15.6 in.) long — Indo-Pacific and Red Sea

- **Lighting** Contains symbiotic algae; needs strong light intensity.
- **Water Quality** Like all giant clams, it needs excellent water quality, including calcium for building its calcareous shell.
- **Feeding** Photosynthetic; no intentional feeding necessary.

A favorite of many clam keepers, this species is not difficult to keep and is often beautifully pigmented. It has prominent, widely spaced scalelike flutes on its shells, hence the name "squamosa," meaning scales.

Mollusca; Bivalvia; Veneroida; Tridacnidae

Giant Clam

Tridacna gigas

To 137 cm (53 in.) long

Central Indo-Pacific

- **Lighting** Photosynthetic—needs strong light intensity.
- **Water Quality** Like all giant clams, it needs excellent water quality, including calcium for building its calcareous shell.
- **Feeding** Photosynthetic; no intentional feeding necessary.

This is the largest bivalve known and is easy to keep. The mantle may be rather plain, or brightly colored. Commercially raised specimens readily are available. Grows fast and needs plenty of space on a bed of sand or coral rubble.

Mollusca; Bivalvia; Veneroida; Tridacnidae

Boring Clam

Tridacna crocea

To 19 cm (7.4 in.) long

Central Indo-Pacific

Lighting Photosynthetic—needs strong light intensity.

Water Quality Like all giant clams, it needs excellent water quality, including calcium for building its calcareous shell.

Feeding Photosynthetic; no intentional feeding necessary.

The smallest of the giant clams and one of the most vivid. Needs careful acclimation and very bright light. In the wild, it normally lives completely buried in coral or wedged into crevices between coral rocks.

Mollusca; Cephalopoda; Octopoda; Octopodidae

Eight-armed octopuses ***Octopus* spp.**

Up to 1 m (3.3 ft.) or more All seas

Aquascaping Need a large aquarium with many hiding places.

Feeding Carnivorous; require high-protein meaty foods.

Compatibility These highly predatory animals feed on other invertebrates and fishes; best kept in their own aquarium. May secrete blue ink that can poison the aquarium

Many octopus species are known, and they make fascinating, relatively hardy aquarium animals. They need special housing, with a secure cover to prevent escape attempts. For advanced aquarists.

Mollusca; Cephalopoda; Octopoda; Octopodidae

Blue-ringed Octopus ***Hapalochlaena lunulata***

To 10 cm (3.9 in.) long Indo-Pacific

■ **Hazards** This species is extremely poisonous and its bite can be fatal or debilitating to humans.

■ **Compatibility** Very aggressive and will attack almost everything—including its keeper. It is a predator and will decimate any population of crustaceans and fishes.

A deadly animal in a small package decorated with flashing blue markings. This species has taken its toll on Asian fishermen, and it ought not to be collected or sold to amateur aquarists.

Platyhelminthes; "Acoela"

Commensal flatworms ***Convoluta* and *Waminoa* spp.**

To 1 cm (0.4 in.) Circumtropical

Lighting May possess symbiotic algae and use light energy.

Feeding Graze on tiny plants, animals, and detritus trapped in the mucus of corals.

Compatibility Reef safe, but may blossom into huge populations.

These small commensal flatworms are often introduced to the aquarium with corals. Contrary to some fears, they are not parasitic. Nonetheless, they can reach plague numbers and are regarded as pests in the coral reef aquarium.

Annelida; Polychaeta; Amphinomidae

Blue-striped Fireworm ***Eurythoe* sp.**

To about 10 cm long Indo-Pacific

Substrate Usually found in holes in live rock or in calcareous tubes leftover from other animals.

Hazards Bristles are sharp and contain poison secreted from a gland at their bases. Stings are painful and can lead to inflammation.

Compatibility Reef safe. Feeds from detritus and food remains.

Introduced to the aquarium on live rock. This species is an example of a useful worm that removes detritus, thrives well, and can establish large populations.

Annelida; Polychaeta; Amphinomida; Amphinomidae

Bearded Fireworm ***Hermodice carunculata***

To 30 cm (11.7 in.) Caribbean

■ **Hazards** This worm's bristles are sharp and contain a toxin that causes painful, burning stings and can lead to inflammations.

■ **Compatibility** Not reef safe. An active predator that feeds on corals, anemones, and other sessile invertebrates.

May appear mysteriously in the reef aquarium, usually having arriving with live rock. Bristleworms that become pests can be caught and removed with tube traps available from aquarium suppliers.

Annelida; Polychaeta; Sabellidae

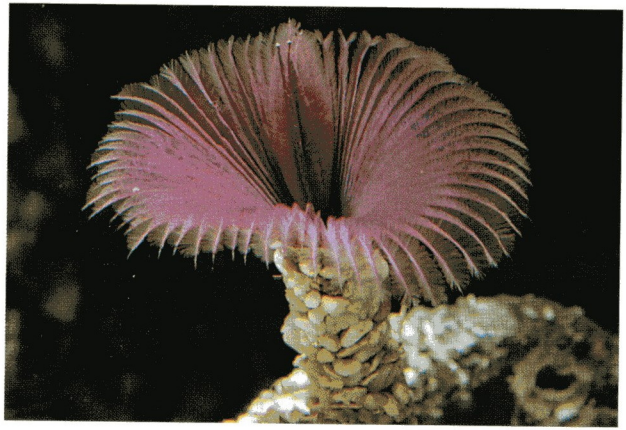
Indo-Pacific Tube Worm ***Sabellastarte spectabilis***

To 20 cm (7.8 in.) long Indo-Pacific

Compatibility Completely harmless and a natural companion for stony corals. Excellent choice for small tanks and sand-bottom biotopes.

Feeding Feeds on tiny plankton and organic particles collected by the crown. Does well in systems with ample organic matter and detritus, but may need intentional feeding in the reef aquarium.

A good invertebrate for beginning aquarists. Hardy if fed well with microplankton or liquid organic foods for filter feeders.



Annelida; Polychaeta; Sabellidae

Feather duster worm ***Megalomma* sp.**

To 20 cm (7.8 in.) long Indo-Pacific; Mediterranean

Aquascaping Best kept on reasonably deep sandy substrate where the worm can bury its tube.

Feeding Collects tiny plankton and organic particles with its feathery crown. Needs plenty of food in the reef aquarium.

One of many ornamental worms that are peaceful and attractive additions to the marine aquarium. Hardy if well fed. Note sand grains covering the worm's protective tube.

Annelida; Polychaeta; Sabellidae

Social Feather Duster

Bispira brunnea

Colony 20-30 cm (7.8-11.7 in.) across

Caribbean

- **Aquascaping** Needs peaceful conditions and harmless tankmates; best kept in a small, quiet reef system.
- **Feeding** Feeds on tiny plankton and organic particles collected by the crown. Needs plenty of food in the reef aquarium.
- **Compatibility** Reef safe. May fall victim to large brittlestars.

This small feather duster forms dense colonies of clones and varies in color from region to region. These pretty worms are as delicate as they appear, and are among the more difficult feather dusters to keep.

Annelida; Polychaeta; Sabellidae

Feather Duster Worm

Bispira tricyclia

To 16 cm (6.2 in.) long

Indo-Pacific

Aquascaping Best kept on reasonably deep sandy substrate where the worm can bury its tube.

Feeding Collects tiny plankton and organic particles with its feathery crown. Needs plenty of food in the reef aquarium.

This species is especially handsome, with a white crown and small, red, compound eyes. Tends to be hardy if fed well. The tube is soft and without attached particles.

Annelida; Polychaeta; Serpulidae

Christmas Tree Worm ***Spirobranchus corniculatus***

To 8 cm (3.1 in.) Indo-Pacific

- **Lighting** Its host coral requires intense lighting to thrive.
- **Water Quality** Demands excellent water quality, including calcium supplementation for construction of its tubes and for its host.
- **Feeding** Feeds on tiny plankton and organic particles collected by the crown. Will benefit from regular rations for filter feeders.

Lives in association with stony corals in the genus *Porites* and must be collected and maintained in a living coral. If the coral dies, the worms will not survive. For advanced aquarists only.

Annelida; Polychaeta; Serpulidae

Magnificent Calcareous Tubeworm

Protula bispiralis

To 30 cm (11.7 in.)

Western Indo-Pacific

Circulation Requires moderate to strong water movement.

Water Quality Needs calcium supplementation for skeletal growth.

Feeding Catches tiny plankton and organic particles with its feathery crown. Will do best in a system where filter feeders are intentionally nurtured.

An impressive worm with a thick, stony tube, this species is not easy to keep, and many specimens probably waste away for lack of food.

Annelida; Polychaeta; Serpulidae

Feather Duster Worm — ***Filogranella elatensis***

About 1 cm (0.4 in.) long — Indo-Pacific and Red Sea

Water Quality Needs calcium supplementation for skeletal growth.

Feeding Catches tiny plankton and organic particles with its feathery crown. Will do best in a system where filter feeders are carefully observed and intentionally nurtured.

Distinguished by hard, white, calcareous tubes and bright red crowns, but a difficult species to feed and maintain. Forms dense aggregations, probably as a result of cloning.

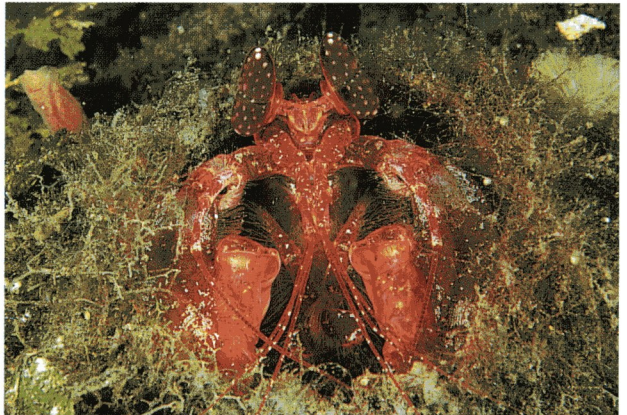
Arthropoda; Chelicerata; Merostomata; Limulidae

Horseshoe Crab ***Limulus polyphemus***

To 90 cm (35 in.) Caribbean

- **Aquascaping** Needs a habitat with a large open sandy area.
- **Water Quality** Needs cooler temperatures, 21-24°C (70-75°F).
- **Feeding** Carnivorous; will eat mussels and shrimps.
- **Compatibility** Potentially destructive and not reef safe.

This a living fossil that occasionally becomes available to aquarists. Hardy, but must have a special aquarium. Beneath the formidable shell are chelicerae (claws) and five pairs of walking legs.



Crustacea; Stomatopoda; Gonodactylidae

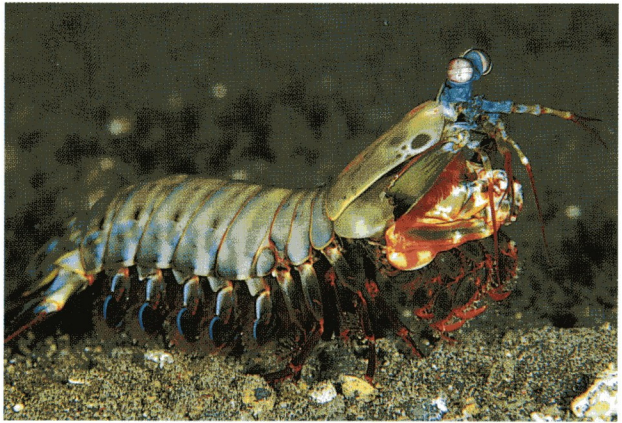
Mantis shrimps ***Lysiosquillina* spp.**

To 10 cm (3.9 in.) long Circumtropical

Feeding Carnivorous; will greedily accept all meaty foods.

Compatibility Not reef safe. These aggressive predators will feed on small fishes and other motile invertebrates. Can decimate populations of other crustaceans, such as small shrimps.

A number of species make their way into the reef aquarium, usually arriving with live rock. They are easy to keep, but hard to catch if they start attacking tankmates . The first five pairs of appendages are modified into dangerous clublike claws used for smashing prey.



Crustacea; Stomatopoda; Odontodactylidae

Harlequin Mantis Shrimp ***Odontodactylus scyllarus***

To 15 cm (5.9 in.) long — Indo-Pacific

Aquascaping Best kept in its own aquarium with deep sand, where it can dig burrows up to 40 cm (15.6 in.) long.

Feeding Carnivore; an aggressive predator that will feed on small fishes and other motile invertebrates.

Compatibility Not reef safe. Very aggressive toward other specimens of its species.

A large, vibrantly colored, and very predatory shrimp. Often imported and hardy, but must have its own isolated aquarium.

Crustacea; Decapoda; Alpheidae

Pistol shrimps — ***Alpheus* spp.**

1-6 cm (0.4-2.3 in.) long — Tropical seas

Aquascaping Need a deep sand bed for their burrowing activities.

Feeding Normal diet is small invertebrates, but will take substitute meaty foods in captivity.

Compatibility Reef safe. Many species live in association with "shrimp gobies" in shared burrows. Best kept in a quiet setting.

Many colorful species are collected. They can be hardy, but need careful acclimation to captivity. By snapping a peg on the right claw the pistol shrimps generate a sharp"POP," hence the common name.

Crustacea; Decapoda; Alpheidae

Red Snapping Shrimp

Alpheus armatus

To 5 cm (2 in.) long

Caribbean

Aquascaping Needs a deep sand bed for its burrowing activities.

Feeding Normal diet is small invertebrates, but will take substitute meaty foods in captivity.

Compatibility Reef safe. This species lives in association with the Corkscrew Anemone (page 112) and is best kept in a small, special aquarium where this symbiotic relationship can be displayed.

This is a hardy shrimp seen in colors of red or orange, sometimes brown, with banded red and white antennae.

Crustacea; Decapoda; Hippolytidae

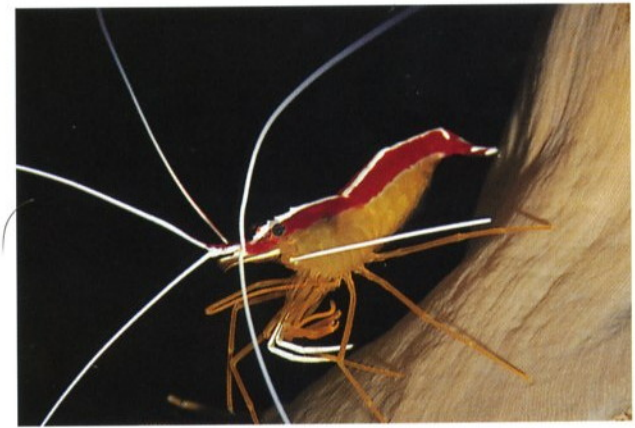
White-banded Cleaner Shrimp ***Lysmata amboinensis***

To 15 cm (5.9 in.) long Indo-Pacific

■ **Feeding** In nature, this species feeds by picking parasites from fishes. In the aquarium, it will also readily accept to other meaty foods, such as adult brine shrimp, mysis shrimp, and even flakes.

■ **Compatibility** Reef safe. Best kept in small groups.

A graceful addition to any reef tank with its long white antennae—used on the reef to advertise its parasite-cleaning services. Easy to keep, but allow long and careful acclimation to new water conditions (sudden changes of pH, temperature, or salinity can be fatal).



Crustacea; Decapoda; Hippolytidae

Cardinal Cleaner Shrimp

Lysmata debelius

To 4 cm (1.6 in.) long

Indo-Pacific

Aquascaping Collected in deep water; requires an aquarium with shady caves and shelters.

Feeding In nature, this species feeds by picking parasites from fishes. In the aquarium, it will also readily accept other meaty foods, such as adult brine shrimp, *Mysis* shrimp, and even flakes.

Compatibility Reef safe. Best kept in small groups.

A brilliant little animal, shy but hardy. Needs slow acclimation to new water—sudden changes of pH, temperature, or salinity can be fatal.

Crustacea; Decapoda; Hippolytidae

Peppermint Shrimp — ***Lysmata wurdemanni***

To 5 cm (2 in.) long — Caribbean, Eastern Atlantic

■ **Feeding** In nature, this species feeds by picking parasites from fishes. In the aquarium, it will also readily accept other meaty foods, such as adult brine shrimp, *Mysis* shrimp, and even flakes.

■ **Compatibility** Reef safe. Best kept in small groups.

A small shrimp often associated with sponges of the genus *Aplysina*. Easily kept and has been commercially bred in captivity. Used by some aquarists to control *Aiptasia* anemones, although not all hobbyists report the same degree of success.

Crustacea; Decapoda; Hippolytidae

Red Rock Shrimp ***Lysmata californica***

To 7 cm (2.7 in.) long — Gulf of California to Galapagos

Aquascaping Needs a rocky habitat where it can hide in small crevices and under rocks.

Feeding In nature, the species feeds by removing parasites from fishes. It will readily adapt to substitute foods.

Compatibility Reef safe. Best kept in groups.

Occasionally appears in the aquarium trade and is hardy, but easily confused with *L. wurdemanni* (above). Large numbers of this shrimp are sometimes found in association with the California Moray.

Crustacea; Decapoda; Hippolytidae

Common Marble Shrimp ***Saron marmoratus***

Body to 4 cm (1.6 in.) long Indo-Pacific

Feeding Carnivore; a greedy eater that will accept meaty foods.

Compatibility Not reef safe. May pick on corals and other invertebrates.

Although too potentially destructive for most reef tanks, this is a handsome and hardy shrimp. Ideal for smaller biotope settings, with a small group of males and females. (Males develop long claws, these are lacking in subadult males and females.)

Crustacea; Decapoda; Hippolytidae

Pinecone Marble Shrimp

Saron inermis

To 3 cm (1.2 in.) long

Indo-Pacific

Aquascaping A very shy, nocturnal species that needs shadowy hiding caves and crevices.

Feeding Natural diet includes tiny invertebrates and small-polyped corals, but it will accept most meaty foods.

Compatibility Not reef safe. May feed on corals and other invertebrates.

Only moderately hardy and rather reclusive. A candidate for a special system with other nocturnal species.

Crustacea; Decapoda; Hippolytidae

Violet-legged marble shrimp

***Saron* sp.**

To 12 cm (4.7 in.)

Indo-Pacific

Aquascaping Provide protective hiding caves and crevices.

Feeding Carnivorous; will accept various meaty foods.

Compatibility Not reef safe. May feed on corals and other invertebrates.

This is a new, undescribed species that is exceptionally beautiful, but about which little is known. Occasionally collected in Indonesia and the Philippines. Care requirements are likely similar to other *Saron* spp.

Crustacea; Decapoda; Hippolytidae

Sexy Shrimp

Thor amboinensis

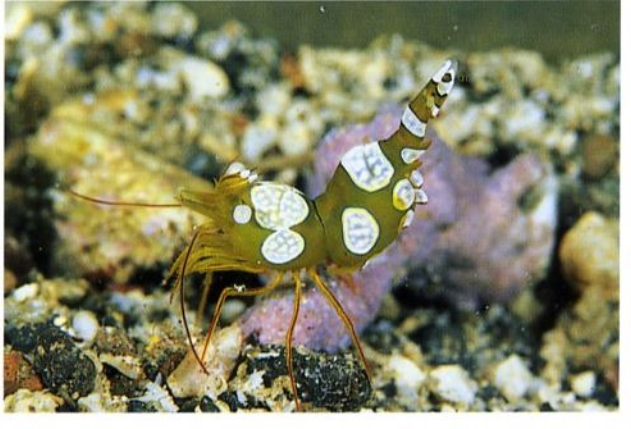
To 2 cm (0.8 in.) long

Circumtropical

Aquascaping This shrimp lives commensally with corals and anemones and should be kept with a living host. Sand anemones and the Pizza Anemone (page 114) are a perfect match.

Compatibility Reef safe. Can be preyed upon by fishes.

A very tiny but elegantly beautiful commensal shrimp found living with many species of anemones and corals in the wild. Hardy if given an anemone and a peaceful aquarium. Has an interesting habit of raising and wiggling its abdomen. Best kept in pairs or groups.



Crustacea; Decapoda; Rhynchocinetidae

Common Dancing Shrimp ***Rhynchocinetes durbanensis***

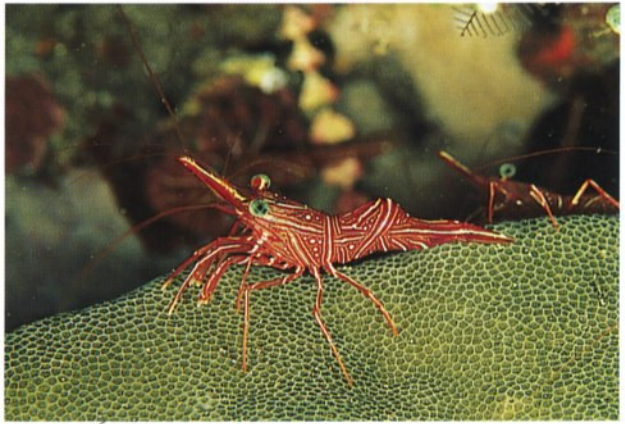
To 4 cm (1.6 in.) long — Indo-Pacific

Aquascaping Appropriate habitat is a cave or overhanging rocks.

Compatibility Not perfectly reef safe; may eat some coral polyps. Best kept in groups of males and females (males have bigger claws).

Feeding Carnivorous; offer meaty foods, such as adult brine shrimp, *Mysis* shrimp, chopped crustaceans, or fish flesh.

If fed properly, this is a hardy little shrimp. Needs slow acclimation to new water conditions—sudden changes of pH, temperature, or salinity can be fatal. Often misidentified as "*R. uritai*."



Crustacea; Decapoda; Gnathophyllidae

Harlequin Shrimp — ***Hymenocera picta***

To about 5 cm (2 in.) long — Indo-Pacific; Red Sea

Aquascaping Most appropriate for a small reef aquarium where the beauty of this species can be appreciated and its interesting biology studied. Best kept in pairs or a small group.

Feeding Carnivorous. Lives exclusively by attacking and eating sea stars (in particular *Naroda* and *Linckia* species). Must be given "feeder" sea stars in order to survive.

A glorious small shrimp that is hardy and long-lived—if fed with live sea stars—and has been bred in captivity.

Crustacea; Decapoda; Palaemonidae

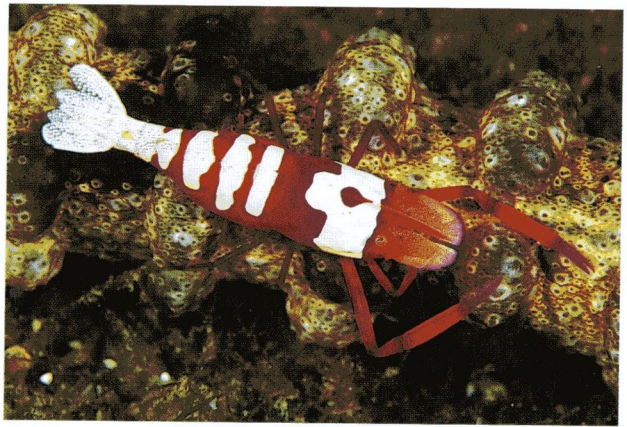
White-patched
Anemone Shrimp ***Periclimenes brevicarpalis***

To 3 cm (1.2 in.) long Indo-Pacific

Lighting Needs a brightly lit aquarium with good circulation for its anemone host.

Compatibility Reef safe. Lives in association with anemones, most often with the Pizza Anemone (*Cryptodendrum adhaesivum*, page 114). Must be provided with an anemone host in the aquarium.

This is a delicate, beautiful commensal shrimp. It is only moderately hardy and must be carefully acclimated to new water conditions.



Crustacea; Decapoda; Palaemonidae

Emperor Anemone Shrimp ***Periclimenes imperator***

To 2 cm (0.8 in.) long Indo-Pacific; Red Sea

■ **Feeding** Difficult to keep properly nourished. In nature, it feeds on mucus secreted from its host.

■ **Compatibility** Lives commensally with many animals, often with the Spanish Dancer (*Hexabranchus sanguineus*, page 132), but also with many sea cucumbers. Needs a suitable host in the aquarium, and arranging this is easier said than done.

This is a most-demanding species that ideally should be purchased with its host. For expert aquarists only.

Crustacea; Decapoda; Palaemonidae

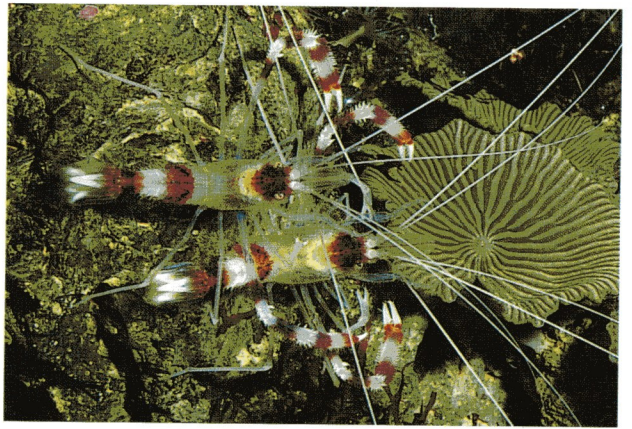
Pederson's Commensal Shrimp ***Periclimenes pedersoni***

To 2 cm (0.8 in.) long — Caribbean, Tropical Western Atlantic

Lighting Requires intense lighting for its host sea anemone.

Compatibility Reef safe. Lives individually, in pairs, or in larger groups associated with sea anemones. Needs a healthy host sea anemone (for example, *Condylactis gigantea*) to survive in captivity.

A lovely little commensal shrimp that is easy to keep in a quiet dedicated aquarium, but which will often disappear in a reef community tank. Must have slow, careful acclimation to new water conditions. Other *Periclimenes* species need similar care and consideration.



Crustacea; Decapoda; Stenopodidae

White-banded Coral Shrimp

Stenopus hispidus

To 9 cm (3.5 in.) long

Circumtropical and partly subtropical

Aquascaping Appreciates having rocky overhangs or caves.

Feeding In nature, this species feeds by removing parasites from fishes. It will readily adapt to substitute foods in captivity.

Compatibility Reef safe. Very aggressive toward other specimens of the same species. Should be kept singly or in male-female pairs.

A hardy, showy shrimp that can be kept for years in a well-maintained coral reef aquarium. Mated pairs will produce eggs and fry regularly and these are relished by fishes and corals.

Crustacea; Decapoda; Stenopodidae

Golden Coral Shrimp ***Stenopus scutellatus***

To 3 cm (1.2 in.) long Caribbean

Feeding In nature, this species feeds by removing parasites from fishes. It will readily adapt to substitute foods in captivity.

Compatibility Reef safe. Very aggressive toward other specimens of the same species. Should be kept singly or in male-female pairs.

This is a delicate species that may not fare well in a large, competitive reef tank. Relatively hardy if carefully acclimated and given a peaceful aquarium.

Crustacea; Decapoda; Nephropidae

Debelius' Reef Lobster ***Enoplometopus debelius***

To 10 cm (3.9 in.) long — Central Indo-Pacific

Aquascaping Often disappears into the rockscape of a community aquarium. A smaller reef with limited hiding places will be a better choice to view and study this beautiful lobster.

Feeding Carnivorous; readily accepts all meaty foods.

Compatibility Generally reef safe, but is a possible threat to small fishes. May be kept singly or in pairs.

This miniature lobster is both beautiful and hardy. It tends to be reclusive, but can be kept for years.

Crustacea; Decapoda; Nephropidae

Hairy Reef Lobster ***Enoplometopus occidentalis***

To 12 cm (4.7 in.) long Indo-Pacific, Red Sea

Aquascaping Often disappears into the rockscape of a community aquarium. A smaller reef with limited hiding places will be a better choice to view and study this small lobster.

Feeding Carnivorous; readily accepts all meaty foods.

Compatibility Generally reef safe, but is a possible threat to small fishes. May be kept singly or in pairs.

With a red body covered in white, hairlike cirri, this little lobster is interesting and easy to keep.

Crustacea; Decapoda; Synaxidae

Australian Miniature Spiny Lobster

Palinurellus wieneckii

To 15 cm (5.9 in.) long

Central Indo-Pacific

Aquascaping This lobster is nocturnal and is best kept in a small aquarium where it can be observed. A sandy aquarium with a few live rocks is ideal—perhaps with some corals that open at night to feed.

Feeding As a scavenger that feeds on food remains, this and other lobsters will accept a variety of meaty aquarium foods.

With its long antennae and poorly developed claws, this species resembles its larger, edible relatives. Very hardy and easy to keep.

Crustacea; Decapoda; Palinuridae

Painted Spiny Lobster

Panulirus versicolor

Body to 40 cm (15.6 in.) long

Indo-Pacific

Aquascaping Should be given overhangs and small caves in which it can hide.

Feeding A scavenger that feeds on food remains; will accept a variety of meaty foods, including frozen and dried rations.

Compatibility Not completely reef safe. May prey on fishes and invertebrates. May become destructive to the reefscape as it grows.

One of the few spiny lobsters that is suited for a robust community tank with very stable rockwork. Hardy, but allow slow, careful acclimation.

Crustacea; Decapoda, Diogenidae

Caribbean Big Claw Hermit Crab ***Calcinus tibicen***

2-3 cm (0.8-1.2 in.) Caribbean

■ **Feeding** Grazes on algae and food remains. May need intentional feeding of dried *Spirulina* or nori (sushi seaweed) if algae supplies are limited.

■ **Compatibility** Reef safe. Needs to be stocked in high numbers to be efficient as an algae control.

One of a group of small, hardy hermit crabs that can help control algae growth in the aquarium. Legs and body are reddish brown, eyestalks are orange, and the left claw is bigger than the right.

Crustacea; Decapoda, Diogenidae

Blue-knuckle Hermit Crab

Calcinus elegans

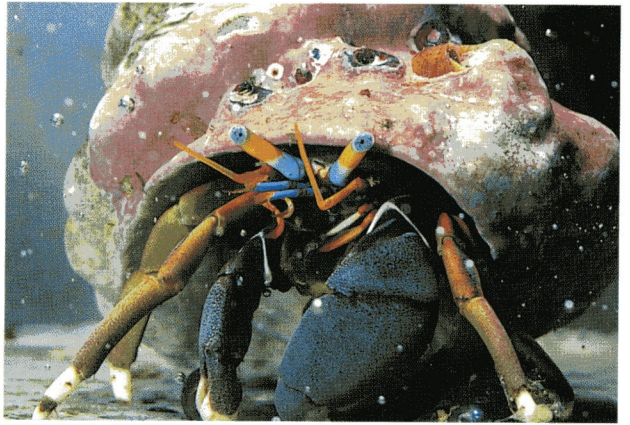
2-6 cm (0.8-2.3 in.)

Australia

■ **Feeding** Grazes on algae and food remains. May need intentional feeding of dried *Spirulina* or nori (sushi seaweed) if algae supplies are limited.

■ **Compatibility** Reef safe. Needs to be stocked in high numbers to be efficient as an algae control.

An eye-catching species with distinctive jet black legs and bright blue transverse bands, blue eyes and eyestalks, and bright orange antennae. Rarely seen in the trade, but hardy.



Crustacea; Decapoda, Diogenidae

Blue-eyed Hermit Crab ***Calcinus laevimanus***

2-3 cm (0.8-1.2 in.) Indo-Pacific

■ **Feeding** Grazes on algae and food remains. May need intentional feeding of dried *Spirulina* or nori (sushi seaweed) if algae supplies are limited.

■ **Compatibility** Reef safe. Needs to be stocked in high numbers to be efficient as an algae control.

Another of the many small, hardy hermit crabs that can help control algae growth in the aquarium. Many color forms exist, but the eyestalks are always orange and blue. Hardy, but lives just 1-2 years.

Crustacea; Decapoda, Diogenidae

Caribbean Equal-handed Hermit Crab ***Clibanarius tricolor***

2-3 cm (0.8-1.2 in.) Caribbean

Feeding Excellent algae grazer but should be kept in high numbers in order to be effective. Feeds on algae and food remains.

This attractive crab sports blue legs with orange transverse bands as well as blue eyestalks. As the common name implies, both claws are of equal size. The species is hardy but—like many hermits—not long-lived. One of the best of all the algae grazers.

Crustacea; Decapoda, Diogenidae

Green-striped hermit crab ***Clibanarius* sp.**

3-4 cm (1.2-1.6 in.) Indo-Pacific

Feeding Grazes on algae and food remains. May need intentional feeding of dried *Spirulina* or nori (sushi seaweed) if algae supplies are limited.

Compatibility Reef safe.

An excellent algae grazer, but needs to be kept in high numbers to serve an effective algae-control function. Hardy and easily kept, it often can be found resting during the day but is more active at night.

Crustacea; Decapoda, Diogenidae

Red Hermit Crab ***Dardanus megistos***

To 30 cm (11.7 in.) Indo-Pacific

Feeding Carnivorous; greedily eats all meaty foods.

Compatibility Not reef safe. Very aggressive and predatory. Can be useful in a system with larger fishes where it scavenges food remains.

A handsome crab, but one that can wreak havoc in a reef aquarium. Common in the trade and often imported as juveniles. Hardy, highly predatory, and only appropriate for a species tank or a fish-only reef.

Crustacea; Decapoda, Diogenidae

Anemone Hermit Crab ***Dardanus pedunculatus***

To 10 cm (3.9 in.) Indo-Pacific

■ **Feeding** Omnivorous; grazes on small invertebrates, dead organisms, and food remains, as well as algae.

■ **Compatibility** Generally reef safe. Lives in association with the *Calliactis polypus* anemones, which attach to the crab's shell. Best kept in a small aquarium where the relationship can be observed.

A fascinating example of mutualism, with two different organisms providing benefit to each other. The anemones provide camouflage, while the hermit crab hunts for food remains.

Crustacea; Decapoda, Diogenidae

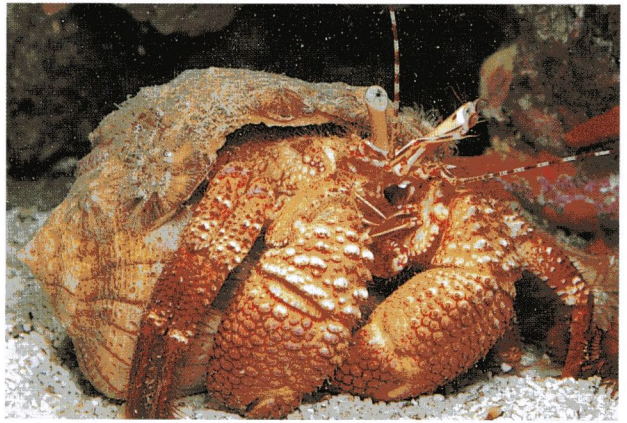
Red-legged Hermit Crab ***Paguristes cadenati***

2 cm (0.8 in.) Caribbean

■ **Feeding** Grazes on algae and food remains. May need intentional feeding of dried *Spirulina* or nori (sushi seaweed) if algae supplies are limited.

■ **Compatibility** Reef safe.

With a bright scarlet body and pale orange eyestalks and antennae, this is a colorful little hermit, both hardy and excellent as an algae grazer. Not long-lived, however.



Crustacea; Decapoda, Diogenidae

American Giant Hermit Crab ***Petrochirus diogenes***

To 25-30 cm (9.8-11.7 in.) Caribbean; Western Atlantic

Aquascaping Lives on sandy bottoms and on seagrass beds; perfect for a special aquarium replicating this habitat.

Feeding A scavenger and carnivore, grazing rather indiscriminately on small invertebrates (e.g., mollusks and worms). Accepts substitute meaty foods in the aquarium.

Compatibility Not reef safe.

The largest hermit crab from the Caribbean region and a possible choice for a biotope or fish-only reef tank. Hardy and long-lived.

Crustacea; Decapoda, Diogenidae

Polkadot Hermit Crab ***Phimochirus operculatus***

2-3 cm (0.8-1.2 in.) Caribbean

■ **Feeding** Grazes on algae and food scraps; often steals food from other hermit crabs.

■ **Compatibility** Reef safe.

A common, hardy, and active algae-grazing hermit that is useful in the reef aquarium. It is a bit more aggressive than other such hermits; it may attack snails and members of its own species. Right claw much bigger than left claw.

Crustacea; Decapoda; Porcellanidae

Spotted Porcelain Crab ***Neopetrolisthes ohshimai***

2-3 cm (0.8-1.2 in.) Indo-Pacific

Lighting Requires bright lighting for its host sea anemone.

Feeding A filter feeder that captures suspended organic particles with its specially modified appendages. Will also take bits of meaty foods that come its way.

Compatibility Reef safe. Lives in pairs commensally with sea anemones. In the aquarium, it must have a host to survive.

Very hardy and can live for years if kept with a host anemone, which the tiny crab never leaves. Larger spots than *P. maculatus* (below).

Crustacea; Decapoda; Porcellanidae

Porcelain Crab ***Neopetrolisthes maculatus***

2-3 cm (0.8-1.2 in.) Indo-Pacific

Lighting Requires bright lighting for its host sea anemone.

Feeding A filter feeder that captures suspended organic particles with its specially modified appendages. Will also take bits of meaty foods that come its way.

Compatibility Reef safe. Lives in pairs commensally with sea anemones. In the aquarium, it must have a host to survive.

Hardy and long-lived when kept with a healthy host anemone. Has finer spots than the similar *Neopetrolisthes ohshimai* (above).

Crustacea; Decapoda; Dromiidae

Sponge crabs

Cryptodromia **spp.**

To about 5 cm (2 in.)

Indo-Pacific; Caribbean

Aquascaping To keep with its decorative sponge, a small aquarium suited to the needs of the sponge is required.

Feeding These scavengers will also eat small invertebrates.

Compatibility Not reef safe. Best kept with aggressive tankmates that can defend themselves.

These primitive, hardy, and predatory crabs carry live sponges or algae on their backs as camouflage and protection. The last pair of legs is modified to hold the sponge. Species are from at least three genera.

Crustacea; Decapoda; Majidae

Decorator Crab ***Camposcia retusa***

To about 10 cm (3.9 in.)across Indo-Pacific

Aquascaping To keep with its decorative camouflage made up of various filter-feeding organisms, a special aquarium suited to the needs of the "decorations" will be required.

Feeding Carnivorous; feeds on all sorts of living and dead food.

Compatibility Not reef safe. Will attack and eat corals.

This unusual crab decorates its body with all sorts of living organisms (sponges, tunicates, macroalgae) which give the crab a perfect camouflage and a most colorful look. Hardy, but aggressively predatory.

Crustacea; Decapoda; Majidae

Arrow Crab, Spider Crab ***Stenorhynchus seticornis***

5-10 (2-3.9 in.)cm Caribbean

- **Aquascaping** Appreciates having rocky ledges and caves.
- **Feeding** Feeds on small invertebrates and may eat bristleworms.
- **Compatibility** Not reef safe. May pick on corals and sessile invertebrates and has even been observed to pierce fishes with its sharp rostrum.

With its long, thin walking legs, this crab has a spidery appearance and a not-very-trustworthy nature in the reef aquarium. Hardy and very appropriate for more robust biotope systems.

Crustacea; Decapod; Xanthidae

Boxer Crab ***Lybia tessellata***

2-3 cm (0.8-1.2 in.) Indo-Pacific; Red Sea

■ **Feeding** Feeds on detritus collected off the substrate by the anemones in its claws. Can be fed finely minced meaty foods.

■ **Compatibility** Reef safe, but should be given a small special aquarium without aggressive tankmates where it can be nurtured and observed.

This crab and its anemone partners are a fantastic example of mutualistic symbiosis.The crab carries a small anemone in each claw for defense and feeding.

Crustacea; Decapoda; Trapeziidae

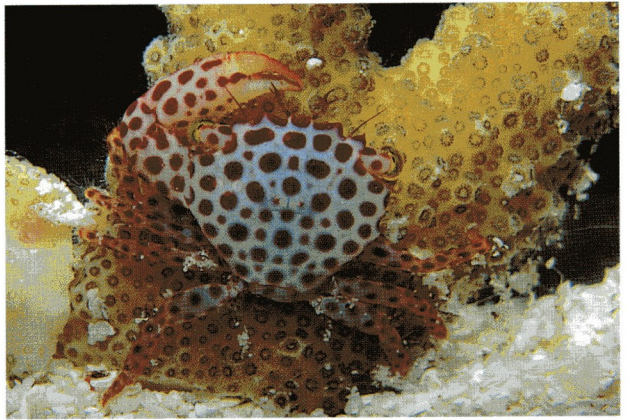
Coral Crab ***Trapezia ferruginea***

2 cm (0.8 in.) Indo-Pacific

Feeding A self-sufficient little crab that lodges within the branches of a stony coral and scrapes the surface of the coral with modified appendages to collect mucus and food particles. Must be kept with a healthy colony of coral in the aquarium.

Compatibility Reef safe. Does not harm its coral host, usually lives with *Pocillopora* spp. or *Stylophora* spp.

Often hitchhikes into the aquarium with stony corals and should not be removed. Hardy if given a host.



Crustacea; Decapoda; Trapeziidae

Spotted Coral Crab

Trapezia wardi

3 cm (1.2 in.)

Indo-Pacific

Feeding A self-sufficient little crab that lodges within the branches of a stony coral and scrapes the surface of the coral with modified appendages to collect mucus and food particles.

Compatibility Reef safe. Lives between stony coral branches of *Pocillopora* spp. and must be given such shelter in the aquarium.

A single colony of corals often contains many specimens of this crab and there is absolutely no need to remove the harmless crabs from the host. Hardy if kept with a healthy coral.

Crustacea; Decapoda; Grapsidae

Sally Lightfoot (Urchin) Crab

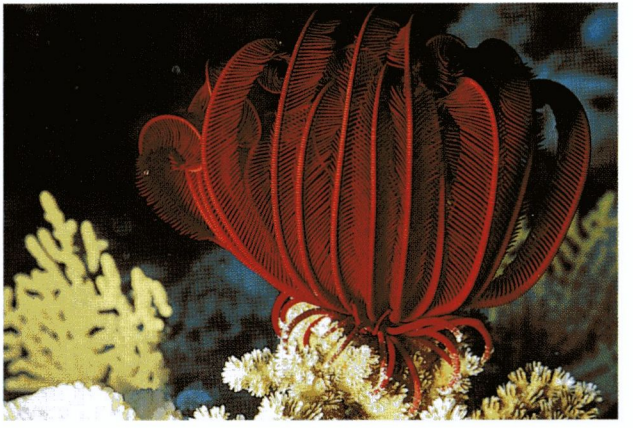
Percnon gibbesi

To 6 cm (2.3 in.)

Caribbean, Atlantic, Eastern Pacific

- **Aquascaping** Occurs in the tidal zones of rocky shores and coral reefs.Very appropriate for a biotope with a tidal zone or land zone.
- **Feeding** Omnivorous; feeds primarily by scraping algae off rocks.
- **Compatibility** Reef safe. Usually harmless, but may catch small fishes. Often associated with the sea urchin *Diadema* spp. (page 153) under which it hides.

A flattened, fast-moving crab that eats algae and will make itself at home on and among live rock aquascapes. Moderately hardy.



Echinodermata; Crinoidea; Comatulida; Himerometridae

Feather star ***Himerometra* sp.**

To 20 cm (7.8 in.) Indo-Pacific

Circulation Needs vigorous alternating water movement.

Feeding Lives on tiny plankton only, such as foraminifers, tiny crustaceans, and phytoplankton. Extremely difficult to feed.

Conservation All crinoids are extremely difficult if not impossible to keep. In general, they should not be collected or purchased.

Beautiful, rather strange animals seen in a rainbow of colors and having featherlike arms and powerful cirri (feet) that allow the animal to walk across the substrate. For expert aquarists only.

Echinodermata; Asteroidea; Valvatida; Oreasteridae

Chocolate Chip Starfish ***Protoreaster nodosus***

To 15 cm (5.9 in.) Western and Central Pacific

Feeding Carnivorous. Will scavenge food scraps or pieces of fish or crustacean flesh.

Compatibility Not reef safe. It is a predatory species that feeds on invertebrates like sponges, worms, and mollusks, and should not be trusted with coral specimens.

This is a hardy, attractive starfish that is not reef safe but can be kept in fish-only reefs or in biotope tanks with a sandy bottom that replicates the seagrass zone where this species is most common.

Echinodermata; Asteroidea; Valvatida; Oreasteridae

Doughboy Starfish ***Choriaster granulatus***

To 40 cm (15.6 in.) Indo-Pacific, Red Sea

Feeding This is an active scavenger that feeds mainly on food remains and detritus but will prey on various invertebrates in its path.
Compatibility Not reef safe. Will eat tiny invertebrates and prey on corals in the aquarium. Too large for many aquariums.

This is a very large species with impressively stout arms. Hardy, but allow slow, careful acclimation to new water conditions. Best kept in a fish-only tank or in a special aquarium where its predatory feeding habits won't be a problem.

Echinodermata; Asteroidea; Valvatida; Oreasteridae

Cushion Star ***Culcita novaeguineae***

To 30 cm (11.7 in.) Indo-Pacific

Feeding In the wild it preys on corals, but will accept other foods in the aquarium, including flake food, mussel flesh, and fish flesh.

Compatibility Not reef safe. Feeds on the polyps of stony corals. Best kept in a fish-only tank or in a special aquarium where its instinctive feeding habits won't prove to be a problem.

Looking much like a pincushion, this is one of three similar species that range in color from green and yellow to brown, orange, and red. Hardy, but allow slow, careful acclimation to new water conditions.

Echinodermata; Asteroidea; Valvatida; Oreasteridae

Knobby Sea Star ***Pentaceraster mammillatus***

To 40 cm (15.6 in.) Indian Ocean, Red Sea

■ **Feeding** Omnivorous; an active scavenger that also feeds on mollusks and other invertebrates.

■ **Compatibility** Not reef safe. Likely to eat corals in the aquarium. Best kept in a fish-only tank or in a special system due to its feeding habits.

A large, common species with prominent knobs or conical spines on its dorsal surface. Hardy, but allow slow, careful acclimation to new water conditions. (*Protoreaster lincki* shown at rear in photo.)

Echinodermata; Asteroidea; Valvatida; Oreasteridae

Cushion Star, Bahama Star ***Oreaster reticulatus***

To 50 cm (19.5 in.) Caribbean, Tropical Atlantic

■ **Feeding** Omnivorous, feeds on a variety of food sources, including detritus, algae, sponges, and other echinoderms. Feeds on live mollusks, such as clams and oysters, everting its stomach and digesting them in their own shells.

■ **Compatibility** Not reef safe. Needs a large system with an open sandy bottom. Found in typical seagrass habitats.

Also known as the Reticulated Sea Star, this large, common species needs a roomy aquarium. Hardy, but must be acclimated slowly.

Echinodermata; Asteroidea; Valvatida; Oreasteridae

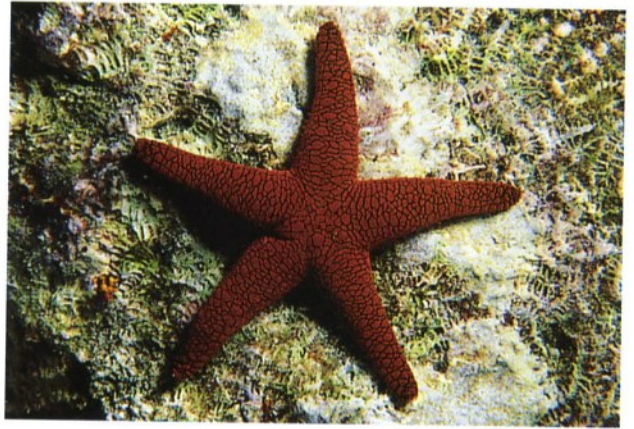
African Sea Star ***Protoreaster lincki***

To 30 cm (11.7 in.) Indian Ocean

Feeding Omnivorous; feeds greedily on a variety of food sources, including sponges, detritus, algae, and other invertebrates.

Compatibility Not reef safe. Will attack corals and other sessile invertebrates. Needs a large system with an open sandy bottom. Found in seagrass beds.

With brilliant red spines, this is a showy and distinctive species for a large tank and tankmates that are not on its usual list of prey. Hardy, but requires slow, careful acclimation to new water conditions.



Echinodermata; Asteroidea; Valvatida; Ophidiasteridae

Elegant Sea Star — ***Fromia indica***

To 9 cm (3.5 in.) — Indo-Pacific

Feeding Omnivorous; grazes over rock, eating algae, tiny invertebrates, and microorganisms living with the algae. Difficult to provide with sufficient food in a typical reef system.

Compatibility Reef safe. Members of this genus are usually trustworthy in a community tank and will not harm sessile invertebrates.

This is one of about a dozen very attractive genus members that are reef safe but difficult to feed and keep the aquarium. Allow slow, careful acclimation to new water conditions.

Echinodermata; Asteroidea; Valvatida; Ophidiasteridae

Elegant Sea Star — ***Fromia milleporella***

To 7 cm (2.7 in.) — Indo-Pacific, Red Sea

Feeding Omnivorous; grazes over rock, eating algae, tiny invertebrates, and microorganisms living with the algae. Difficult to provide with sufficient food in a typical reef system.

Compatibility Reef safe. members of this genus are usually trustworthy in a community tank and will not harm sessile invertebrates.

Part of a genus that is difficult to keep and probably suffers from lack of food in a nutrient-poor reef aquarium. Must be carefully acclimated. (Blue-spotted form is from Red Sea.)

Echinodermata; Asteroidea; Valvatida; Ophidiasteridae

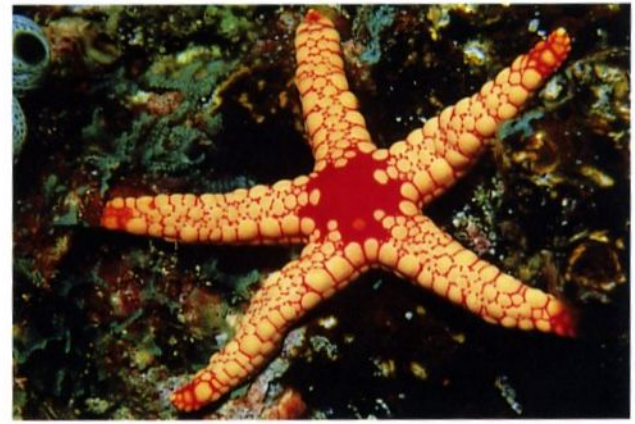
Elegant Sea Star ***Fromia nodosa***

To 8 cm (3.1 in.) Western Indian Ocean

Feeding Omnivorous; grazes over rock, eating algae, tiny invertebrates, and microorganisms living with the algae. Difficult to provide with sufficient food in a typical reef system.

Compatibility Reef safe. members of this genus are usually trustworthy in a community tank and will not harm sessile invertebrates.

A beautiful and often photographed sea star that is, unfortunately, difficult to feed and keep for long periods in the reef aquarium. Needs slow acclimation to the water of a new system.



Echinodermata; Asteroidea; Valvatida; Ophidiasteridae

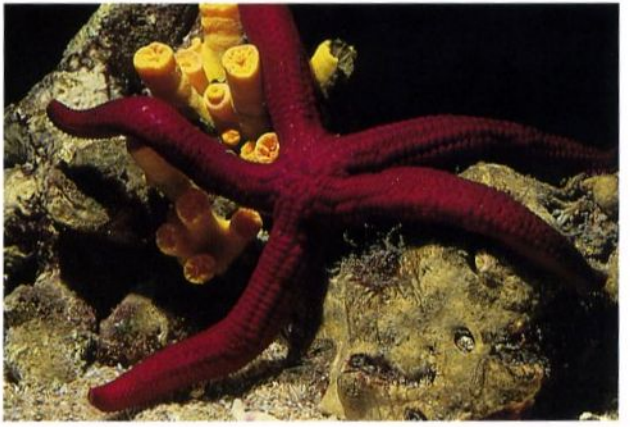
Tamarisk Sea Star — ***Tamaria stria***

To 20 cm (7.8 in.) — Eastern Pacific

Feeding Omnivorous; grazes over rock, eating algae, tiny invertebrates, and microorganisms living with the algae. Difficult to provide with sufficient food in a typical reef system.

Compatibility Generally reef safe, but may attack certain sessile invertebrates.

A richly pigmented sea star that is very sensitive to changing water conditions and thus difficult to ship without damaging stress. Difficult to feed and keep. Must have slow, careful acclimation upon arrival.



Echinodermata; Asteroidea; Valvatida; Ophidiasteridae

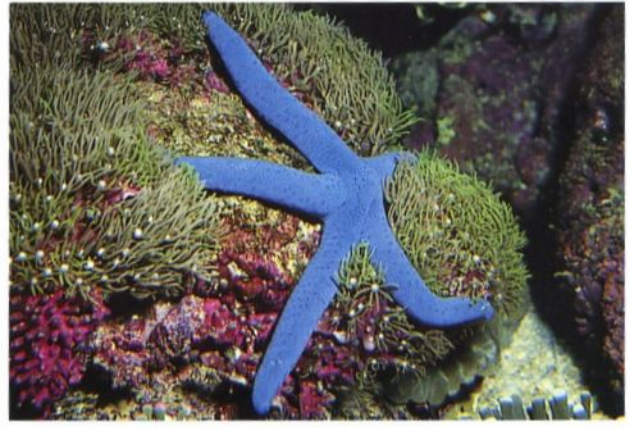
Blue Sea Star ***Linckia laevigata***

To 40 cm (15.6 in.) Indo-Pacific

Feeding Will graze over live rock, eating detritus, algae, and associated microorganisms, but will accept meaty foods (bits of clam or shrimp) placed in its path.

Compatibility Reef safe; excellent for a community tank.

A favorite of many aquarists for its startling blue color and general hardiness once settled into the aquarium. Difficult to acclimate; great care should be taken when introducing this species to your tank. Once accustomed to its new conditions, it is easy to keep and long-lived.



Echinodermata; Asteroidea; Valvatida; Ophidiasteridae

Spotted Linckia ***Linckia multifora***

To 15 cm (5.9 in.) Indo-Pacific and the Red Sea

Feeding Will graze over live rock, eating detritus, algae, and associated microorganisms, but will accept meaty foods (bits of clam or shrimp) placed in its path.

Compatibility Reef safe. Excellent for a community tank.

A curious starfish whose species name means "many pores" and whose coloration varies greatly, from grayish pink to orange-brown. After very slow and careful acclimation, it is often very hardy and can live for many years.

Echinodermata; Asteroidea; Valvatida; Echinasteridae

Spiny Sea Star — ***Echinaster echinophorus***

To 7 cm (2.7 in.) — Caribbean, south to Brazil

Feeding Feeds on detritus, microorganisms, and possibly algae. Difficult to feed on substitute food in the aquarium. Must be kept in with live rock and plenty of detritus and nutrients. Without this it does not survive for long.

Compatibility Reef safe with corals, but may eat some sessile invertebrates.

An intense orange-red species that is often imported but not among the easiest sea stars to keep. Allow careful acclimation.

Echinodermata; Ophiuroidea; Ophiurida; Ophiuridae

Serpent Star — ***Ophiolepis superba***

To 25 cm (9.8 in.) — Indo-Pacific, Red Sea

■ **Feeding** Self-sufficient scavenger, feeds on detritus, feces, and food remains.

■ **Compatibility** Reef safe. Excellent for a reef aquarium. Does not hurt other organisms, except perhaps tiny tubeworms.

Serpent Stars are excellent scavengers, living under live rock and keeping detritus under control. Very hardy and can live for many years. Every reef tank should have several such "cleaners" in the system.

Echinodermata; Ophiuroidea; Ophiurida; Ophiocomidae

Sponge brittle stars ***Ophiothrix* spp.**

To 32 cm (12.5 in.) Circumtropical

■ **Feeding** Self-sufficient scavengers; feed on detritus, feces, food remains, and particles in the water surface film.

■ **Compatibility** Reef safe. Excellent for reef aquariums. Will not hurt other organisms, except perhaps tiny tubeworms.

Very common in the wild and seen in a number of different color variations. Hide under rocks with only their spiny arms stretching out. Sensitive to shipping stresses and changes in water conditions but often hardy and useful scavengers.

Echinodermata; Ophiuroidea; Ophiurida; Ophiocomidae

Black Brittle Star ***Ophiomastix variabilis***

To 25 cm (9.8 in.) Indo-Pacific

■ **Feeding** Self-sufficient scavenger, feeds on detritus, feces, and food remains.

■ **Compatibility** Reef safe. Excellent for a reef aquarium. Does not hurt other organisms, except perhaps tiny tubeworms.

A colorful brittle star and an excellent scavenger, although it will spend most of its time living under live rock and keeping detritus under control. Very hardy and can live for many years. Every reef tank should have several such "cleaners" in the system.

Echinodermata; Ophiuroidea; Ophiurida; Ophiodermatidae

Green Brittle Star ***Ophiarachna incrassata***

To 55 cm (21.6 in.) Indo-Pacific

Feeding An opportunistic, self-sufficient omnivore that feeds on a variety of food, including detritus and food remains. It may occasionally hunt and devour small fishes.

Compatibility Reef safe. A very good scavenger for a community tank, but with a habit of trapping and eating small fishes at night.

A large, robust brittle star, this species is very hardy and a great scavenger. Has been reported to spawn and be raised in captivity

Echinodermata; Ophiuroidea; Ophiurida; Ophiodermatidae

Red Serpent Star ***Ophioderma squamosissimus***

To 44 cm (17.3 in.) Caribbean

■ **Feeding** Self-sufficient scavenger, feeds on detritus, feces, and food remains.

■ **Compatibility** Reef safe. Excellent for a reef aquarium. Does not hurt other organisms, except perhaps tiny tubeworms.

This beautiful orange-red species has smooth legs (unlike the spiny brittle stars), lives under live rock and keeps detritus under control. Very hardy and can live for many years. Every reef tank should have several such "cleaners" in the system.

Echinodermata; Echinoidea; Diadematoida; Diadematidae

Long-spined sea urchins ***Diadema* spp.**

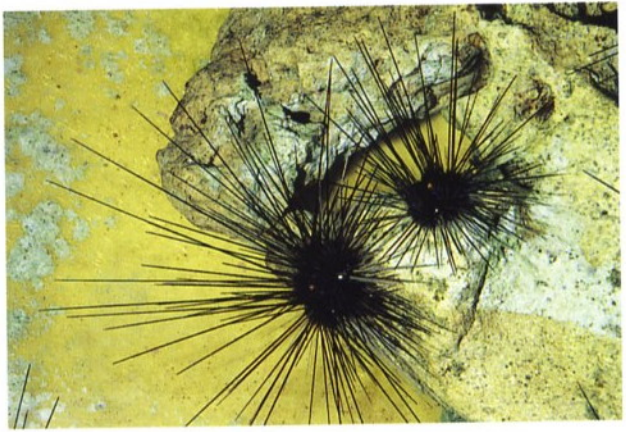
To 40 cm (15.6 in.) Circumtropical

Feeding Grazes on algae, including red calcareous algae, but also on sessile invertebrates such as bryozoans, sponges, and corals. Will accept dried seaweed in the aquarium.

Compatibility Not reef safe.

Hazards The spines are sharp and contain poison; can cause painful stings to humans.

With spines up to 30 cm (11.7 in.) long, these are big urchins. Hardy and easily kept, for fish-keeping systems without corals. Nocturnal.



Echinodermata; Echinoidea; Temnopleuroida; Temnopleuridae

Globe Urchin ***Mespilia globulus***

To 7.5 cm (2.9 in.) Central Pacific

Feeding Feeds on algae, including red calcareous algae and filamentous algae, but may also graze on sessile invertebrates.

Compatibility Reef safe, with caution. One of the few sea urchins that can be kept in a reef aquarium, but it must be watched to ensure that its feeding habits don't turn destructive.

This is an exceptionally attractive urchin and one that may be safe to keep in many reef tanks. Hardy and easily kept. Often carries bits of coral rubble on its bands of short spines.

A beautiful Indo-Pacific urchin especially worthy of respect, *Tripneustes gratilla* has highly venomous tube feet, or pedicellariae, and must be handled with great care.

Echinodermata; Echinoidea; Temnopleuroida; Temnopleuridae

Jewel Urchin ***Salmacis bicolor***

To 13 cm (5.1 in.) Indo-Pacific and Red Sea

Feeding Feeds on algae including red calcareous algae and filamentous algae, but may also graze on sessile invertebrates.

Compatibility Reef safe, with caution. One of the few sea urchins that can be kept in a reef aquarium, but it must be watched to ensure that its feeding habits don't turn destructive.

Part of a large group of short-spined, hard-to-identify urchins that generally prove to be hardy and easily kept.

Echinodermata; Echinoidea; Temnopleuroida; Toxopneustidae

Sea Egg — ***Tripneustes gratilla***

To 15 cm (5.9 in.) — Indo-Pacific, Red Sea

Hazards The pedicellariae contain poison and can cause great pain. Handle with care.

Feeding Mostly herbivorous, grazing on algae.

Compatibility Reef safe, with caution. Must be watched to ensure that it doesn't attack corals or other sessile invertebrates.

Very common in the wild and highly variable in coloration. The body is often camouflaged by seagrass and rubble attached to the spines. Hardy. The very similar Caribbean Sea Egg is *T. ventricosus*.

Echinodermata; Echinoidea; Echinoida; Echinometridae

Rock-boring Urchin ***Echinometra mathaei***

To 10 cm (3.9 in.) Indo-Pacific

Feeding Herbivorous; eats algae, including red calcareous algae.

Compatibility Reef safe, with caution. Will usually ignore corals and other sessile invertebrates, but will graze on calcareous algae and drill holes in live rock. May occasionally develop a taste for corals.

The various species of boring urchins are very common on shallow reef flats where they can be found by the thousands. Very hardy.

Echinodermata; Holothuroidea; Dendrochirotida; Cucumariidae

Sea Apple ***Pseudocolochirus axiologus***

To 20 cm (7.8 in.) Indo-Pacific

- **Circulation** Needs heavy water motion.
- **Feeding** A filter feeder that catches suspended plankton and organic particles with its bushy tentacles. Needs regular feeding.
- **Compatibility** Reef safe. All sea cucumbers can evert their internal organs and dispense the poison holothurin, which will kill fishes and affect the aquarium severely but is not poisonous to humans.

Glorious colors, but often slowly starves in the aquarium if not intentionally fed on a regular schedule. Needs slow, careful acclimation.

Echinodermata; Holothuroidea; Dendrochirotida; Cucumariidae

Small Spiny Sea Cucumber ***Pentacta anceps***

To 8 cm (3.1 in.) Indo-Pacific

- **Circulation** Needs heavy water motion.
- **Feeding** A filter feeder that catches suspended plankton and organic particles with its bushy tentacles. Needs regular feeding.
- **Compatibility** Reef safe. All sea cucumbers can evert their internal organs and dispense the poison holothurin, which will kill fishes and affect the aquarium severely but is not poisonous to humans.

This small plankton-feeding sea cucumber is perfectly suited for the community tank. Hardy if well fed. Needs careful acclimation.

Echinodermata; Holothuroidea; Dendrochirotida; Cucumarilidae

Yellow Sea Apple ***Colochirus robustus***

To 6 cm (2.3 in.) Indo-Australian Archipelago

- **Circulation** Needs heavy water motion.
- **Feeding** A filter feeder that catches suspended plankton and organic particles with its bushy tentacles. Needs regular feeding.
- **Compatibility** Reef safe. All sea cucumbers can evert their internal organs and dispense the poison holothurin, which will kill fishes and affect the aquarium severely but is not poisonous to humans.

Beautiful, bright yellow little sea cucumbers that are excellent for a community tank. Hardy if fed.

Echinodermata; Holothuroidea; Aspidochirotida; Holothuriidae

Donkey Dung ***Holothuria atra***

To 60 cm (23 in.) Indo-Pacific and Red Sea

Aquascaping Needs a sandy substrate where it can feed.

Feeding Feeds on detritus and microorganisms found in the substrate. Excellent scavenger in the reef aquarium.

Compatibility Reef safe. All sea cucumbers can evert their internal organs and dispense the poison holothurin, which will kill fishes and affect the aquarium severely but is not poisonous to humans.

One of a number of large, burrowing sea cucumbers that will keep a sand bed "worked" and clean. Hardy, but allow careful acclimation.

Echinodermata; Holothuria; Aspidochirotida; Holothuriidae

Edible Sea Cucumber ***Holothuria edulis***

To 30 cm (11.7 in.) Indo-Pacific and Red Sea

Aquascaping Needs a sandy substrate where it can feed.

Feeding Feeds on detritus and microorganisms found in the substrate. Excellent scavenger in the reef aquarium.

Compatibility Reef safe. All sea cucumbers can evert their internal organs and dispense the poison holothurin, which will kill fishes and affect the aquarium severely but is not poisonous to humans.

A favorite ingredient in certain Asian cuisines, this species has a pinkish red underside. Hardy, but allow careful acclimation.

Echinodermata; Holothuria; Aspidochirotida; Holothuriidae

Slender Sea Cucumber ***Holothuria impatiens***

To 25 cm (9.8 in.) Circumtropical

Feeding Feeds on detritus and microorganisms found in the substrate. Excellent scavenger in the reef aquarium.

Compatibility Reef safe. Will clean crevices in live rock. Like all sea cucumbers, this species contains the poison holothurin that can kill fishes but is not poisonous to humans.

Not a classic beauty, but with an elongate body mottled in beige and brown and covered with short spines. Hardy, but allow careful acclimation.

Echinodermata; Holothuroidea, Apodida, Synaptidae

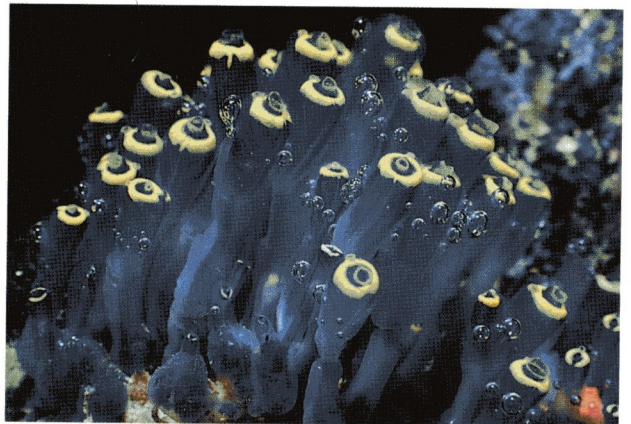
Medusa Worm — ***Synapta maculata***

To 250 cm (98 in.) — Indo-Pacific, Red Sea

Feeding Detritivore; collects detritus and uneaten food off rock and bottom surfaces with its mouth tentacles.

Compatibility Reef safe. Will clean crevices in live rock. Like all sea cucumbers, this species contains the poison holothurin that can kill fishes but is not poisonous to humans.

One of a number of species with feeding tentacles and bodies that can be greatly stretched and retracted. Not among the hardiest sea cucumbers; probably suffers from lack of food in most reef tanks.



Chordata; Tunicata; Enterogona; Clavelinidae

Sea Squirts ***Clavelina robusta***

To 4 cm (1.6 in.) Indo-Pacific

Lighting Need shade or moderate illumination.

Feeding These are filter feeders that screen minute organic particles as they pump water through their hollow body cavities. They are not easy to feed in the aquarium and normally suffer from lack of nutrients in a typical reef system.

These curious animals are often very colorful and sometimes arrive on live rock. Unfortunately, most are very difficult to keep. They will do best in unskimmed systems managed for filter-feeding organisms.

Chordata; Tunicata; Enterogona; Didemnidae

Sea Squirts ***Didemnum molle***

Colony to 4 cm (1.6 in.) Indo-Pacific

Lighting Contain blue green commensal algae (*Prochloron* sp.) and needs strong light intensity.

Feeding Filter tiny organic particles from the water. May benefit from intentional feeding week dissolved and suspended organic foods.

These easily recognized sea squirts are common on the reef, but rarely survive collection and introduction to the aquarium. Probably difficult to keep in most nutrient-poor systems.

Chordata; Tunicata; Pleurogona; Styelidae

Sea Squirts ***Polycarpa aurata***

To 10 cm (3.9 in.) Indo-Pacific

Lighting Should be kept in shade or moderately lit areas.

Feeding Filters tiny organic particles from the water. Will benefit from regular feeding water dissolved and suspended organic foods.

These impressive zooids are big and variable in color, but often yellowish and white with purple stripes. Common on the reef, but rarely imported. Challenging to keep.

Chordata; Tunicata; Pleurogona; Styelidae

Colonial Tunicates ***Botrylloides leachi***

Moderate to large colonies All seas

Lighting Should be kept in shadow or under dim lighting.

Feeding Filter tiny organic particles from the water. Will benefit from regular feeding with dissolved and suspended organic foods.

These are very common colonial tunicates in most seas, even outside the Tropics. The zooids are highly variable in color and form encrusting colonies on live rock or at the base of corals. If enough nutrients are available, this species can thrive and grow well in the reef aquarium.

Chordata; Tunicata; Pleurogona; Pyuridae

Solitary Tunicate ***Herdmania momus***

To 20 cm (7.8 in.) Circumtropical

- **Lighting** Should be kept in dim to moderately lit conditions.
- **Circulation** Needs plenty of water motion.
- **Feeding** Filters tiny organic particles from the water. Will benefit from regular feeding with dissolved and suspended organic foods.

This widespread solitary tunicate is relatively hardy, highly variable in color, and often overgrown with algae or invertebrates. Often found on live rock. Must be well fed in order to grow and thrive.

Vertebrata; Elasmobranchii; Orectolobiformes; Hemiscylliidae

Whitespotted Bamboo Shark ***Chiloscyllium plagiosum***

100 cm (39 in.) Indo-West Pacific

Aquascaping Needs an open sand flat, rocky ledges and caves.

Feeding Heavy feeder that eats meaty foods, such as pieces of marine fish, shrimp, or other seafood.

Compatibility Reef safe in certain circumstances. May be safely combined with corals, if good water quality can be maintained. Will eat crustaceans and small fishes.

An attractive small bottom-dwelling shark that forages at night. Hardy and long lived in large tanks—minimum 1,000 L (260 gal.).

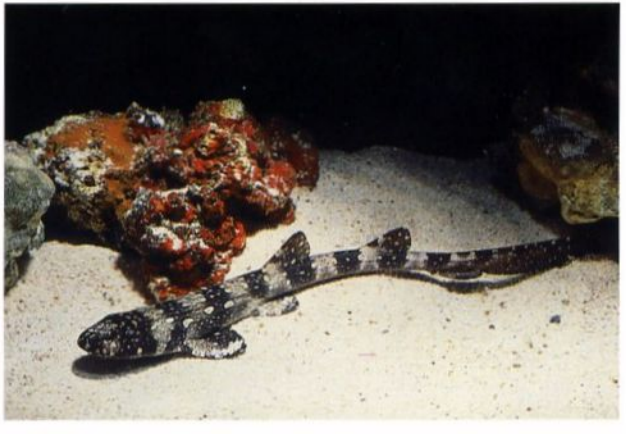


TABLE 7-1

COMMON ALGAE GRAZERS FOR THE MARINE AQUARIUM

COMMON NAME	SCIENTIFIC NAME	MAIN FOOD PREFERENCES
Striped Bristletooth	*Ctenochaetus striatus*	Diatoms and other microscopic algae; detritus.
Orangeshoulder Surgeonfish	*Acanthurus olivaceus*	Diatoms, detritus, short filamentous algae.
Orangespine Unicornfish	*Naso lituratus*	Kelplike brown algae such as *Sargassum* and *Dictyota*.
Powder Blue Surgeonfish	*Acanthurus leucosternon*	Filamentous algae and fleshy green algae.
Sailfin Tang	*Zebrasoma veliferum*	Filamentous algae and fleshy green algae.
Yellow Tang	*Zebrasoma flavescens*	Filamentous algae and fleshy green algae.
Foxface Rabbitfish	*Lo vulpinus*	Filamentous algae and fleshy green algae.
Bicolor Blenny	*Ecsenius bicolor*	Short filamentous algae.
Jeweled Blenny	*Salarias fasciatus*	Short filamentous algae.
Neritid snails	*Nerita* spp.	Very short filamentous algae as well as microscopic algae.
Astraea snails	*Astraea* spp.	Very short filamentous algae as well as microscopic algae.
Hermit crabs	*Calcinus* spp., *Clibanarius* spp., *Paguristes cadenati*, *Phimochirus operculatus*	Very short filamentous algae as well as microscopic algae.
Sea urchins	*Echinometra* spp., *Diadema* spp., *Echinothrix* spp., *Mespilia globulus*, *Tripneustes gratilla*	All kinds of short algae, including coralline red algae.

ABLE 2-3

COMPONENTS OF A SUCCESSFUL CORAL REEF AQUARIUM

COMPONENT	TASKS	MAINTENANCE	COMMENTS
WATER	This is the natural environment for our animals. As much as is possible, provide the necessary elements for the organisms kept.	Small but regular water changes are in most cases necessary, usually limited to a total of less than 10% a year in a well balanced tank.	Check parameters like salinity, pH, and temperature often, and keep a record of the values.
LIVE ROCK AND SAND	These important elements create natural decoration as well as providing a variety of micro- and macro organisms in the captive environment.	Do not move or rearrange the live rock aquascape once it is designed. Leave the rocks in peace and allow them to develop.	Good water motion around the rock is desirable.
PROTEIN SKIMMER	Removes dissolved organic nutrients before they are decomposed by bacteria and thereby keeps the system desirably nutrient-poor.	The skimmer needs proper and regular cleaning on a fixed schedule.	In tanks where a higher level of nutrient is desired, a biological filter can be used instead of a protein skimmer.
LIGHT	Light is mandatory for providing energy to the primary producers (photosynthesizers) in the system.	Lamps and bulbs need to be replaced at least once a year; metal halide lamps even more often.	When new lamps are installed, an increase in UV-radiation can occur, which can be harmful to organisms. Observe their reactions closely.
WATER MOTION	Motion is necessary not only to move food particles and waste products but to simulate a key factor in the natural habitat.	Use powerful alternating or surging current water motion. Create your own water motion regime and maintain it.	We cannot duplicate the water motion found in nature, but most marine aquariums need better water circulation.
FILTRATION (OTHER THAN PROTEIN SKIMMER)	Removes dissolved waste products that the skimmer cannot extract.	Change activated carbon regularly. Change or clean mechanical filter medium often. Change phosphate-absorbing medium according to the schedule recommended for that product.	In most cases, filtration other than skimming is not needed. Activated carbon can be very efficient, but can cause nutrient depletion. Phosphate-removing media can be very efficient if phosphate is a problem.
CALCIUM	Add calcium to replace that used by calcium-fixing organisms, such as corals and clams.	Check the calcium concentration and the carbonate hardness of the water regularly and adhere to a regime of calcium and buffer supplementation as needed.	The use of calcium (Kalkwasser) was introduced by reefkeeping pioneer Peter Wilkens in the early 1980s and revolutionized marine aquarium keeping.
THE AQUARIST	Observe your living organisms and provide them the care and feeding they require. You have the sole responsibility for their well-being.	Be informed—learn about the natural habitat and the basic biological and chemical requirements of your plants and animals. Be patient.	Many new aquariums are ruined because animals are added too soon. Allow at least 8-12 weeks before animals other than detritus- and algae-eating organisms are added.

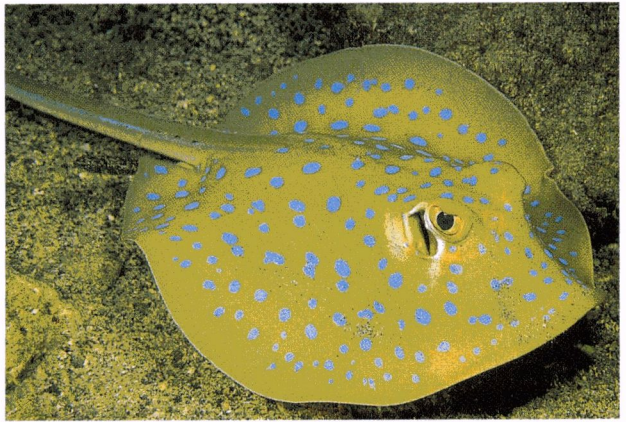
TABLE 2-1

ELEMENTS OF SEAWATER IMPORTANT TO THE AQUARIST

Many trace elements are vital to living organisms even though they occur in minute concentrations. The trace elements noted here are often discussed among marine enthusiasts, either because they are problematic or because they are believed to be of utmost importance to the well-being of the reef aquarium. Copper, for instance, is a heavy metal and highly toxic to fishes and invertebrates, but incorporated in many medicines used against parasites. Iodine is often added to the aquarium and is important to many algae as well as invertebrates, but it rapidly becomes depleted in a closed system. Silicon is common in the sea (but yet not recognized as a major element), but can cause an uncontrolled blooming of diatomaceous algae in the closed marine aquarium.

ELEMENT	FORM IN SEAWATER	CONCENTRATION (mg/L)
Major Elements		
Chloride	Cl^-	19,354
Sulfate	SO_4^{2-}	2,712
Bromine	Br^-	67.3
Fluorine	F^-	1.3
Boron	B	4.5
Sodium	Na^+	10,770
Magnesium	Mg^{2+}	1,290
Calcium	Ca^{2+}	412
Potassium	K^+	399
Strontium	Sr^{2+}	7.9
Some Trace Elements		
Silicon	$Si(OH)_4$	2,000
Manganese	Mn^{2+}, $MnCl^+$	0.0002
Iron	$Fe(OH)_2+$, $Fe(OH)_4^-$	0.002
Copper	$CuCO_3$, $CuOH^+$	0.0005
Iodine	IO_3^-, I^-	0.06

(After Spotte, 1979. *Seawater Aquarium, the Captive Environment.* John Wiley & Sons.)



Vertebrata; Elasmobranchii; Rajiformes; Dasyatidae

Bluespotted Ribbontail Ray ***Taeniura lymma***

70 cm (27 in.) total length — Indo-Pacific, Red Sea

Aquascaping Needs a very large open sand flat overhung by rocky cave formations in a large aquarium.

Feeding Carnivorous; often difficult to feed. May accept fresh seafood items. Try live shrimp and worms.

Compatibility Reef safe with corals. Will eat other invertebrates.

One of the most beautiful rays, but the majority of imported specimens die from starvation or other, unknown causes. For experts only.

Vertebrata; Actinopterygii; Anguilliformes; Muraenidae

Snowflake Moray ***Echidna nebulosa***

90 cm (35 in.) Indo-Pacific, Red Sea

Aquascaping Must have caves or other suitable hiding places.

Feeding Primarily feeds on crustaceans in the wild. Will take a variety of meaty seafoods offered on a feeding stick.

Compatibility Reef safe, but may eat crustaceans, mollusks, and small fishes.

Among the more peaceful moray eels; very hardy and long-lived. Safe with corals and most fishes. A large eel may put strains on water quality in a captive reef.

quality in a captive reef.

Vertebrata; Actinopterygii; Anguilliformes; Muraenidae

Zebra Moray ***Gymnomuraena zebra***

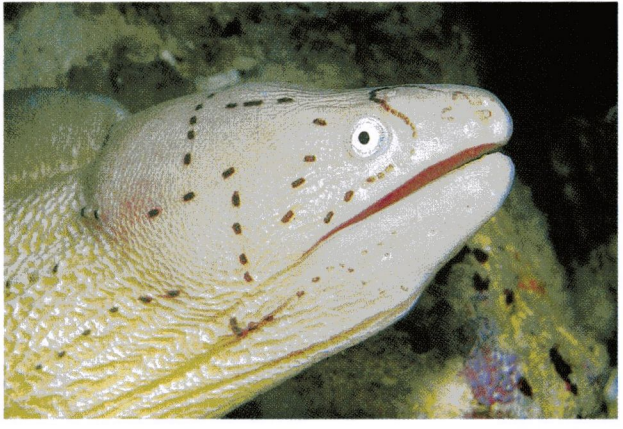
130 cm (51 in.) long; 25 cm (9.8 in.) diameter Indo-Pacific

Aquascaping Must have caves or other suitable hiding places.

Feeding Primarily feeds on crustaceans in the wild. Often reluctant to feed at first, usually will take a variety of meaty seafoods offered on a feeding stick.

Compatibility Reef safe, but may eat ornamental crustaceans and mollusks. Usually will not chase fishes.

A strikingly handsome eel, and among the more peaceful morays. Suitable for larger fish tanks. Hardy and long lived.



Vertebrata; Actinopterygii; Anguilliformes; Muraenidae

Gray Moray ***Siderea grisea***

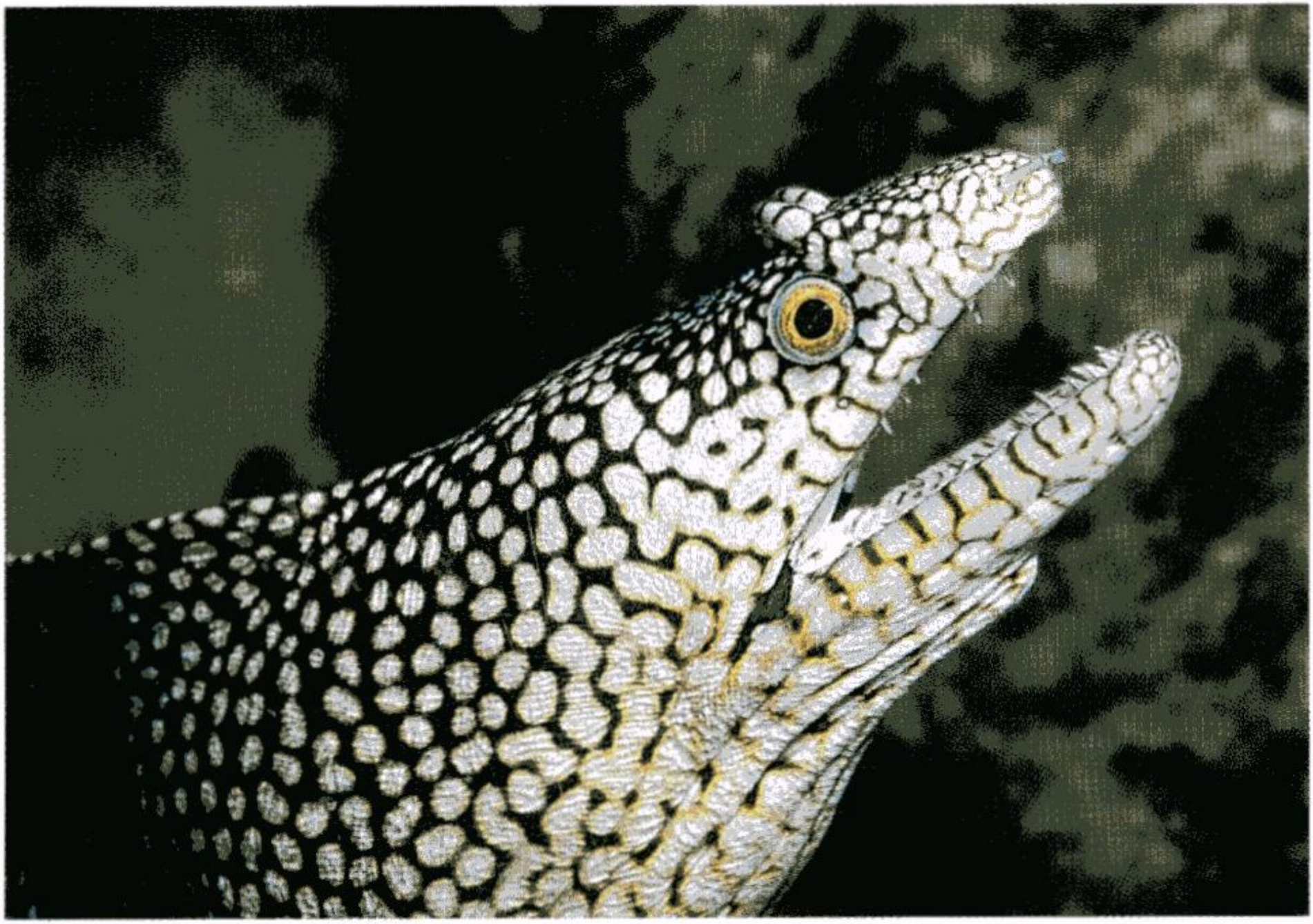
65 cm (25 in.) Red Sea, Western Indian Ocean

Aquascaping Must have caves or other suitable hiding places.

Feeding Readily accepts meaty foods in the aquarium.

Compatibility Reef safe and relatively peaceful, but is a threat to most free-living invertebrates, particularly crustaceans. May eat small fishes, under 20 cm (7.8 in.).

An elegant moray that is becoming more common in shipments from the Red Sea. Safe to keep with corals, if its nutrient-generating abilities do not lower the water quality.



Most moray eels, such as this Blackear Moray Eel (*Muraena melanotis*) are reasonably docile creatures, but aggressiveness and feeding habits differ from species to species.

Vertebrata; Actinopterygii; Anguilliformes; Muraenidae

Ribbon Eel ***Rhinomuraena quaesita***

120 cm (47 in.) Indo-west-Pacific

Aquascaping Needs caves or other suitable hiding places. Easily escapes from tanks that are not tightly covered.

Feeding Difficult to feed. Usually needs live feeder fish when first acquired. May accept mussel meat and shrimp. Slow feeder; may have difficulty competing with aggressive species.

Compatibility Reef safe, but a threat to small fishes.

Beautiful hermaphroditic species (juveniles black, males blue, females yellow). Poor survival in captivity. Only for experienced aquarists.

Vertebrata; Actinopterygii; Anguilliformes; Congridae

Spotted Garden Eel ***Heteroconger hassi***

35 cm (13.7 in.) Indo-Pacific, Red Sea

Aquascaping Requires a thick bed of fine sand for burrowing; minimum 15 cm (5.9 in.) deep. Needs gentle current along the bottom.

Compatibility Best in colonies of several specimens. Provide minimum area of 30 x 30 cm (12 x 12 in.) per eel.

Feeding Carnivores; pluck passing food from the current. Will accept brine shrimp, mysid shrimp, baby mollies, chopped seafood.

Fascinating but very shy fish that retreats into its burrow at the slightest sign of danger. Many similar, related species.

Vertebrata; Actinopterygii; Siluriformes; Plotosidae

Coral Catfish ***Plotosus lineatus***

40 cm (15.6 in.) Indo-Pacific

Feeding Omnivorous; readily accepts most foods.

Compatibility Reef safe, but will eat smaller fishes as it grows.Do not combine with any fish small enough to be swallowed whole.

Hazards Fin spines equipped with venom glands, can inflict painful stings on humans.

A very appealing and active fish when kept as a juvenile in schools. As it matures, it becomes more solitary and assumes a much less attractive, grayish brown overall coloration. Very hardy.

Vertebrata; Actinopterygii; Lophiiformes; Antennariidae

Warty Frogfish ***Antennarius maculatus***

10 cm (3.9 in.) Indo-Pacific; Mauritius to Solomon Islands

Feeding Highly voracious fish predator. May ingest slender fishes longer than itself. Live fish may be needed to initiate feeding. Once settled, usually accepts nonliving, meaty foods from a feeding stick.

Compatibility Reef safe, but will eat smaller fishes or crustaceans.Tends to be aggressive toward members of its own species and will eat conspecifics that are smaller than itself.

A fascinating species with many different color morphs. May change colors to blend with the surroundings. Good choice for species tank.

Vertebrata; Actinopterygii; Syngnathiformes; Centriscidae

Coral Shrimpfish ***Aeoliscus strigatus***

15 cm (5.9 in.) Indo-Pacific

Aquascaping Does best with established live rock or dense seagrass to provide a varied, rich supply of live, tiny food organisms.

Feeding Requires frequent feedings of small benthic and/or planktonic crustaceans, like brine shrimp, mysid shrimp, copepods.

Compatibility Reef safe but shy. Keep in schools of 7 or more, with peaceful fishes—pipefishes, seahorses, gobies, or blennies.

An unusual fish that looks great schooling in a tank of healthy branching corals, such as *Acropora* spp.

Vertebrata; Actinopterygii; Syngnathiformes; Syngnathidae

Banded Pipefish *Doryrhamphus pessuliferus*

16 cm (6.2 in.) Western Pacific

Aquascaping Does best with established live rock or dense seagrass to provide a varied, rich supply of live, tiny food organisms.

Feeding Feeds on small benthic and planktonic organisms—brine shrimp, copepods, and amphipods. Often accepts moving food only.

Compatibility Reef safe. Needs a peaceful aquarium with noncompetitive tankmates. Easily burned by stinging corals or anemones.

A pretty, peaceful fish that demands expert feeding and peaceful surroundings. Known to clean other fishes for parasites in nature.

Vertebrata; Actinopterygii; Syngnathiformes; Syngnathidae

Common Seahorse ***Hippocampus kuda***

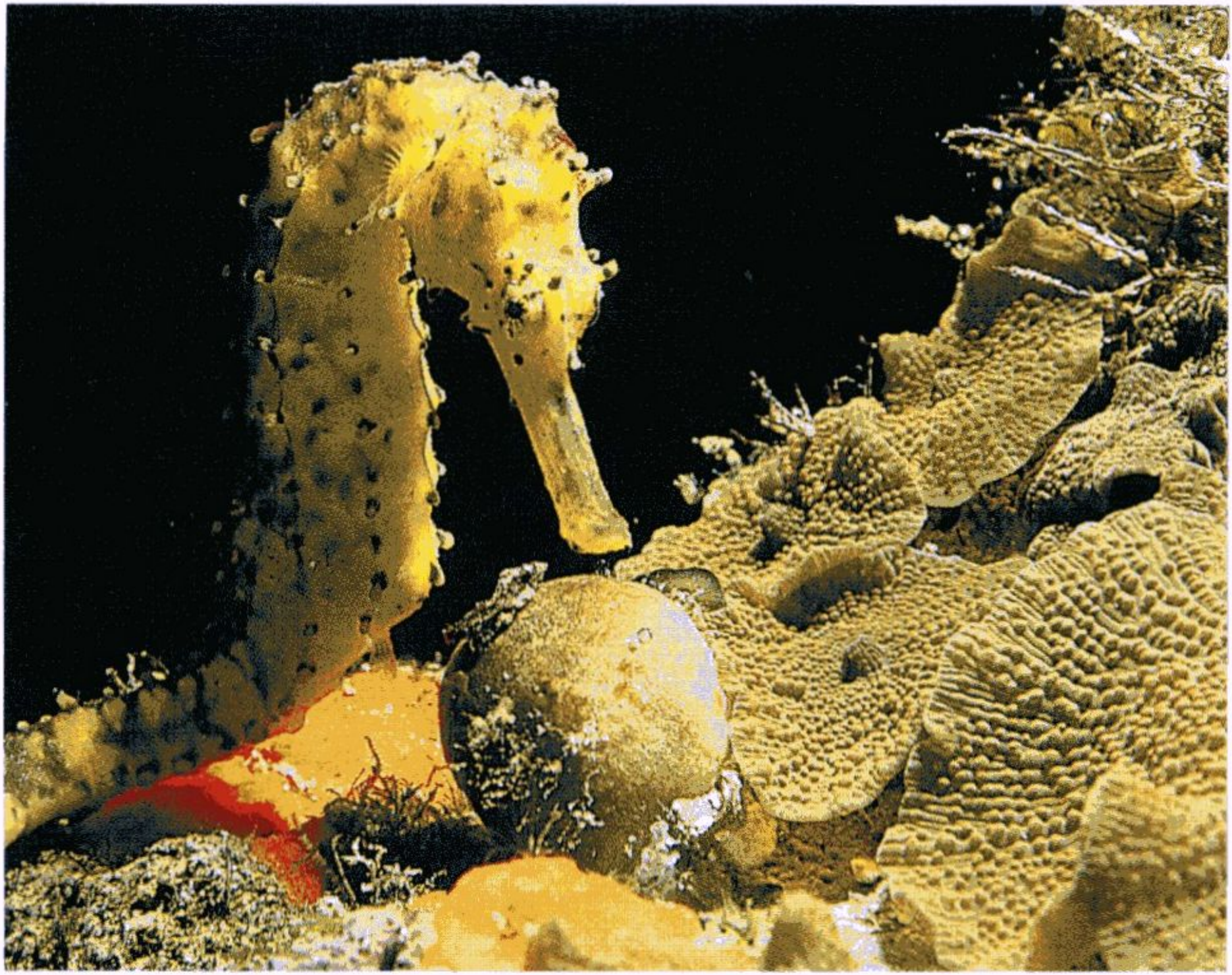
7 to 17 cm (2.7-6.6 in.) Indo-Pacific

■ **Feeding** Difficult to feed. Needs frequent feedings of vitamin-enriched live or frozen mysid shrimp. May accept only moving foods.

■ **Compatibility** Not safe in a reef aquarium. Will be harmed by long-tentacled corals or anemones. Needs peaceful tankmates.

■ **Conservation** An endangered species in many areas. Look for captive-propagated specimens.

Very interesting animals, but not especially hardy and very demanding of special feeding and care. A small species tank is recommended.



Seahorses (*Hippocampus* spp.) need special feeding and placid tankmates. As with all fishes, know their needs before buying.

Vertebrata; Actinopterygii; Scorpaeniformes; Scorpaenidae

Leaf Scorpionfish ***Taenianotus triacanthus***

10 cm (3.9 in.) Indo-Pacific

Feeding Carnivorous; takes meaty foods, but will frequently refuse anything but live food.

Compatibility Reef safe, but may eat any fish or crustacean that is small enough to be swallowed.

Hazards Fin spines are equipped with venom glands. Can inflict painful stings on humans, occasionally with severe side effects.

This quiet species has many color morphs and is an interesting fish, but avoid housing it with smaller fishes and crustaceans.

Vertebrata; Actinopterygii; Scorpaeniformes; Scorpaenidae

Twinspot Lionfish ***Dendrochirus biocellatus***

12 cm (4.7 in.) Indo-Pacific; Sri Lanka to the Society Islands.

Aquascaping Needs caves and crevices for hiding.

Feeding Meaty foods: crustaceans and fish meat. Perhaps the most difficult lionfish to feed, often refuses anything but live food.

Compatibility Reef safe, but will eat small fishes and shrimps.

Hazards Fin spines equipped with venom glands. Can inflict painful stings on humans, occasionally with severe side effects.

A rather shy and secretive species that tends to hide much of the time, particularly when first added to an aquarium. Not a beginner's fish.

Vertebrata; Actinopterygii; Scorpaeniformes; Scorpaenidae

Zebra Lionfish ***Dendrochirus zebra***

25 cm (9.8 in.) Indo-Pacific; East Africa to Samoa

- **Aquascaping** Needs rocky caves and crevices for hiding.
- **Feeding** Meaty foods: crustaceans and fish meat. May need live food to encourage feeding.
- **Compatibility** Reef safe, but will eat small fishes and shrimps.
- **Hazards** Fin spines equipped with venom glands. Can inflict painful stings on humans, occasionally with severe side effects.

Excellent aquarium fish to combine with corals in a reef tank, but often secretive. Tends to be aggressive toward other lionfishes.

Vertebrata; Actinopterygii; Scorpaeniformes; Scorpaenidae

Common Lionfish ***Pterois volitans***

30 cm (11.8 in.) Eastern Indo-Pacific

Feeding Meaty foods; crustaceans and fish meat. May need live food to initiate feeding.

Compatibility Reef safe, but large and will eat any fish or crustacean that is small enough to be swallowed.

Hazards Fin spines equipped with venom glands. Can inflict painful stings on humans, occasionally with severe side effects.

Excellent aquarium fish to keep with corals in a reef tank, and much less secretive than most of its relatives. Very hardy but predatory.

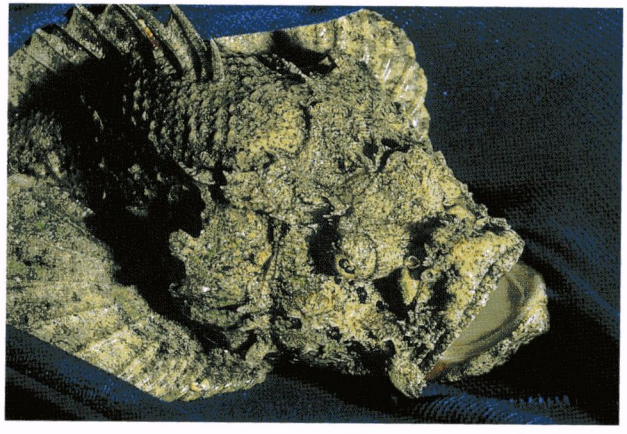
Vertebrata; Actinopterygii; Scorpaeniformes; Scorpaenidae

Spotfin Lionfish ***Pterois antennata***

20 cm (7.8 in.) Indo-Pacific

- **Aquascaping** Requires rocky caves and crevices for hiding.
- **Feeding** Meaty foods; crustaceans and fish meat. May need live food to initiate a feeding response.
- **Compatibility** Reef safe, but will eat small fishes and shrimps.
- **Hazards** Fin spines equipped with venom glands. Can inflict painful stings on humans, occasionally with severe side effects.

A flamboyant fish with its fins fully spread and very compatible with live corals. It does tend to be secretive and is difficult to feed at first.



Vertebrata; Actinopterygii; Scorpaeniformes; Scorpaenidae

Stonefish ***Synanceia verrucosa***

35 cm (13.7 in.) Indo-Pacific; Red Sea to Mangareva

Feeding Carnivore: meaty foods, crustaceans, and fish meat.

Compatibility Reef safe, but will eat any fish it can swallow.

Hazards Fin spines equipped with venom glands and the most powerful toxin produced by any known fish. Can inflict painful wounds, dangerous to humans. Deaths have occurred.

For professional keepers only. Stonefish have no place in a home aquarium because of the severe health risks associated with their handling.

Vertebrata; Actinopterygii; Perciformes; Serranidae

Panther Grouper ***Cromileptes altivelis***

70 cm (27 in.) Indo-Pacific

Aquascaping Needs rocky hiding places or caves.

Feeding Carnivorous; accepts all meaty foods.

Compatibility Safe with corals, but gets large and is likely to eat any animal small enough to be swallowed whole.

Extremely attractive as a juvenile, this is a hardy, fairly peaceful fish, but one that can get quite large. Should be housed in a large aquarium of at least 1,000 L (260 gal.) with powerful filtration to cope with the heavy load of wastes that it will generate.

Vertebrata; Actinopterygii; Perciformes; Serranidae

Coral Hind, Miniata Grouper ***Cephalopholis miniata***

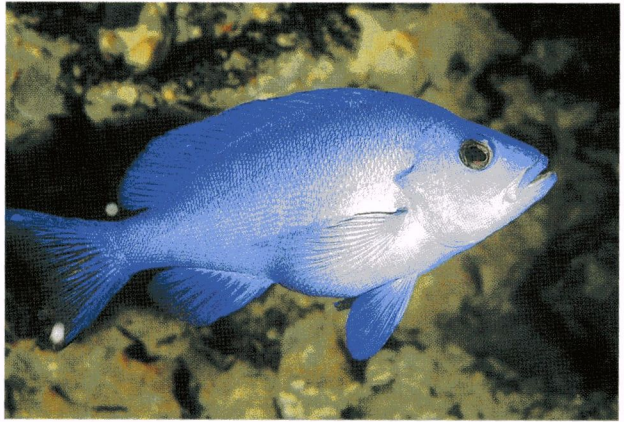
41 cm (16 in.) Indo-Pacific

Aquascaping Needs rocky hiding places or caves.

Feeding Carnivorous; accepts all meaty foods.

Compatibility Safe with corals. Grows large and is likely to eat any and all smaller tankmates. Aggressive toward its own species.

A gorgeous fish that is fairly peaceful, often lying in wait for its next meal. Will need a large aquarium of at least 600 L (150 gal.), equipped with powerful filtration.



Vertebrata; Actinopterygii; Perciformes; Serranidae

Blue Hamlet ***Hypoplectrus gemma***

14 cm (5.5 in.) Caribbean

Aquascaping Needs rocky caves and good hiding places.

Feeding Carnivorous; prefers live crustaceans, but accepts many substitute foods.

Compatibility Reef safe, but will eat crustaceans and small fishes. In smaller systems, keep singly to avoid aggression.

Brilliant blue and well-suited to a tankful of corals, this is a rather shy fish that needs plenty of hiding places to avoid being stressed.

Vertebrata; Actinopterygii; Perciformes; Serranidae

Butter Hamlet ***Hypoplectrus unicolor***

14 cm (5.5 in.) Caribbean

Aquascaping Needs rocky caves and good hiding places.

Feeding Carnivorous; prefers live crustaceans, but accepts many substitute foods.

Compatibility Reef safe, but will eat crustaceans and small fishes. In smaller systems, keep singly to avoid aggression.

Related to the dwarf seabasses, this is an attractive but rather shy fish that needs plenty of hiding places to avoid being stressed.

Vertebrata; Actinopterygii; Perciformes; Serranidae

Harlequin Bass ***Serranus tigrinus***

10 cm (3.9 in.) Caribbean

Aquascaping Needs rocky caves and good hiding places.

Feeding Carnivorous; prefers live crustaceans, but accepts many substitute foods.

Compatibility Reef safe, but will eat crustaceans and small fishes and may harass other tankmates. Keep singly or in mated pairs to avoid fierce aggression.

This is a feisty little bass that may terrorize other tankmates, especially in a smaller aquarium. Will not harm corals.

ertebrata; Actinopterygii; Perciformes; Serranidae

wissguard Basslet — *Liopropoma rubre*

5 cm (3.3 in.) — Caribbean

Aquascaping Needs plenty of caves and crevices for hiding.
Water Quality Sensitive to poor or fluctuating water quality.
Feeding Carnivorous; accepts many meaty foods.
Compatibility Reef safe, but may eat small fishes or ornamen-
l crustaceans.

his is a prized species for reef tanks—small, colorful, and an excellent
nkmate for corals. It cannot be kept with smaller fishes or crus-

Vertebrata; Actinopterygii; Perciformes; Serranidae

Lyretail Anthias ***Pseudanthias squamipinnis***

12 cm (4.7 in.) Indo-Pacific

■ **Compatibility** Reef safe. Does best in groups consisting of one male and several females.

■ **Feeding** Difficult to feed adequately. Needs zooplankton or substitutes: fresh or frozen mysid and adult brine shrimp. At minimum, must be fed (with automatic feeder) at least several times per day. A varied diet, preferably vitamin enriched, is necessary for good health.

Perhaps the most-photographed fish in the sea. Spectacular in large schools, but rather difficult to keep because of its feeding demands.

Vertebrata; Actinopterygii; Perciformes; Serranidae

Purple Anthias ***Pseudanthias tuka***

12 cm (4.7 in.) Indo-west-Pacific

Compatibility Reef safe. Does best in large groups consisting of one male and several females.

Feeding Difficult to feed adequately. Needs zooplankton or substitutes: fresh or frozen mysid and adult brine shrimp. At minimum, must be fed (with automatic feeder) at least several times per day. A varied diet, preferably vitamin enriched, is necessary for good health.

A typical anthias: beautiful, difficult to transport, acclimate, feed, and keep. Suitable for experienced aquarists only.

Vertebrata; Actinopterygii; Perciformes; Grammistidae

Sixline Soapfish ***Grammistes sexlineatus***

27 cm (10.5 in.) Indo-Pacific

Aquascaping Needs caves or other good hiding places.

Feeding Carnivorous; accepts most meaty foods.

Compatibility Reef safe and not aggressive, but will eat any fish or crustacean small enough to be swallowed whole. When stressed or injured, the soapfishes exude a toxic slime that can severely harm or kill their tankmates.

Juveniles have a dramatic appearance, but become less spectacular with age. Potential toxicity is real a liability a in heavily stocked tank.

Vertebrata; Actinopterygii; Perciformes; Pseudochromidae

Oblique-lined Dottyback ***Cypho purpurascens***

7.5 cm (2.9 in.) Western Pacific

Aquascaping Needs numerous hiding places: caves and crevices.

Feeding Prefers crustaceans and other small, free-living invertebrates, but accepts many substitute foods.

Compatibility Very aggressive, particularly toward similar looking fishes. Keep singly or in mated pairs.

Like many dottybacks, colorful but very territorial. Excellent tankmate with corals, but a potential terror for other small fishes. Larger fishes are generally ignored.

Vertebrata; Actinopterygii; Perciformes; Pseudochromidae

Arabian Bluelined Dottyback — ***Pseudochromis aldabraensis***

8.5 cm (3.3 in.) — Arabian Gulf to Sri Lanka

Aquascaping Needs numerous hiding places: caves and crevices.

Feeding Prefers crustaceans and other small, free-living invertebrates, but accepts many substitute foods.

Compatibility Reef safe, but very aggressive, particularly toward similar looking fishes. Keep singly or in mated pairs.

A beauty with a predisposition to attack. Select tankmates carefully; larger fishes are generally ignored. Often confused with *P. dutoiti*.

Vertebrata; Actinopterygii; Perciformes; Pseudochromidae

Royal Dottyback ***Pseudochromis paccagnellae***

7 cm (2.7 in.) Indo-Australian Archipelago

Aquascaping Needs numerous hiding places: caves and crevices.

Feeding Carnivorous; accepts most meaty foods.

Compatibility Reef safe, but extremely aggressive. Should not be kept with docile and shy species, crustaceans, or small free-living invertebrates. Keep singly (only one member of the species).

Excellent in combination with corals, but a territorial fish that can disrupt the social balance of an aquarium with its never-ending aggressiveness. Even much larger fishes are often attacked.

Vertebrata; Actinopterygii; Perciformes; Pseudochromidae

Magenta Dottyback ***Pseudochromis porphyreus***

6.5 cm (2.5 in.) Western Pacific

Aquascaping Needs numerous hiding places: caves and crevices.

Feeding Carnivorous; accepts most meaty foods.

Compatibility Reef safe, but fairly aggressive, particularly toward similar-looking fishes. Keep singly, except in large systems, where pairs or groups may be introduced.

A vivid purple fish that fits in nicely with corals. Somewhat less aggressive than most of its relatives, but choose its tankmates carefully.

Vertebrata; Actinopterygii; Perciformes; Grammatidae

Royal Gramma ***Gramma loreto***

8 cm (3.1 in.) Caribbean

Aquascaping Needs numerous hiding places: caves and crevices.

Feeding Carnivorous; prefers large zooplankton, but accepts many substitute meaty foods.

Compatibility Reef safe. May show aggression toward specimens of the same species or other similar-looking fishes, particularly if kept in a small tank. May be kept in groups in large reef systems.

A wonderful fish for reef tanks, long a favorite of aquarists, and one that can be combined with most other commonly kept animals.

Vertebrata; Actinopterygii; Perciformes; Grammatidae

Brazilian Gramma ***Gramma brasiliensis***

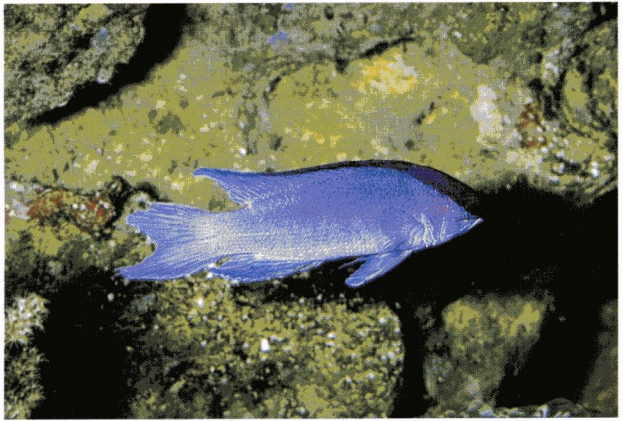
12 cm (4.7 in.) Brazil

Aquascaping Needs numerous hiding places: caves and crevices.

Feeding Carnivorous; prefers large zooplankton, but accepts many substitute meaty foods.

Compatibility Reef safe. May show aggression toward specimens of the same species or other similar-looking fishes, particularly in small tanks. Will often eat shrimps and harass smaller, shy fishes.

Larger and more aggressive than the similar Royal Gramma, which has a smaller mouth and yellow lines on the head.



Vertebrata; Actinopterygii; Perciformes; Grammatidae

Blackcap Basslet *Gramma melacara*

10 cm (3.9 in.) Caribbean

Aquascaping Needs numerous hiding places: caves and crevices.

Feeding Carnivorous; accepts most meaty foods.

Compatibility Reef safe, but fairly aggressive, particularly toward similar looking fishes. Should not be kept with docile and shy species, crustaceans, or other small free-living invertebrates.

Highly sought-after fish for reef tanks, and one that can be combined with most other commonly kept animals. May be shy and secretive, particularly for the first few weeks in a new aquarium.

Vertebrata; Actinopterygii; Perciformes; Plesiopidae

Blue Assessor ***Assessor macneilli***

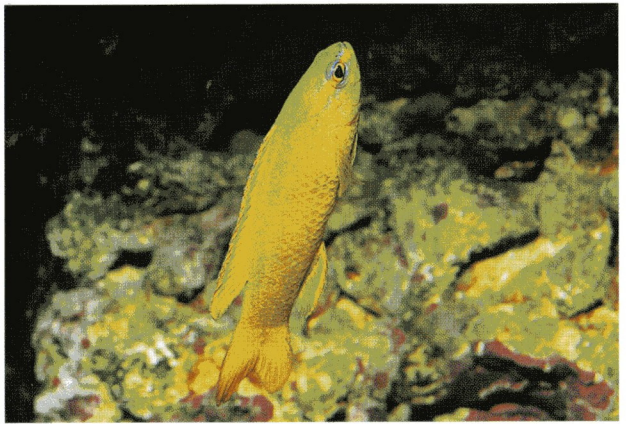
6 cm (2.3 in.) Great Barrier Reef, New Caledonia

Aquascaping Needs a big cave or other overhanging cliff formation to simulate its natural habitat. Commonly swims upside down with its belly against the cave roof.

Compatibility Reef safe. Keep in schools of several specimens.

Feeding Picks zooplankton out of the water column in the wild, but will accept many substitute foods.

In beauty, size, and disposition, a near-perfect fish for a reef aquarium, especially one with a rocky cave. Rarely imported.



Vertebrata; Actinopterygii; Perciformes; Plesiopidae

Yellow Assessor ***Assessor flavissimus***

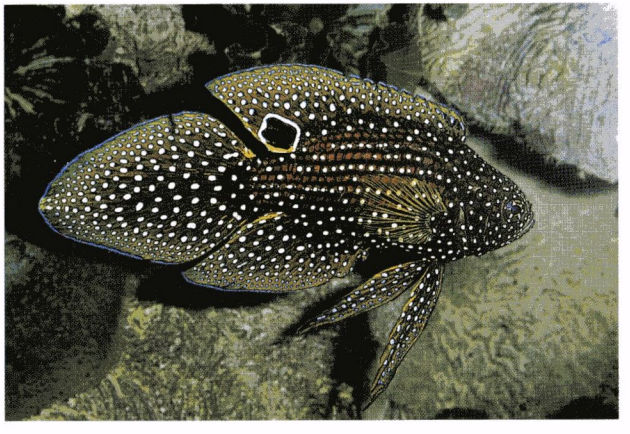
5.5 cm (2.1 in.) Northern Great Barrier Reef

Aquascaping Needs a big cave or other overhanging cliff formation to simulate its natural habitat. Commonly swims upside down with its belly against the cave roof.

Compatibility Reef safe. Keep in schools of several specimens.

Feeding Picks zooplankton out of the water column in the wild, but will accept many substitute foods.

Although rarely available, this is a brightly colored, ideal fish for a reef aquarium, especially one with a rocky cave.



Vertebrata; Actinopterygii; Perciformes; Plesiopidae

Comet ***Calloplesiops altivelis***

20 cm (7.8 in.) Indo-Pacific

Aquascaping Shy; needs a cave or rocky crevice for hiding.

Feeding Carnivorous; accepts most meaty foods.

Compatibility Reef safe. Will eat small crustaceans and very small fishes; otherwise peaceful.

Sometimes called the "Marine Betta" for its flowing fins, this is an excellent fish for reef a tank, especially with a cave. Quite secretive, but will gradually become less shy once established.

Vertebrata; Actinopterygii; Perciformes; Apogonidae

Flamefish ***Apogon maculatus***

11 cm (4.3 in.) Caribbean

Aquascaping Does best with caves and crevices for hiding.

Feeding Carnivorous; accepts many substitute foods. Needs a varied and vitamin-enriched diet to keep its brilliant red color.

Compatibility Reef safe, but likely to eat shrimps and small crustaceans. Often aggressive toward other members of its genus and similar-looking species. Keep in groups in a large aquarium.

A common but interesting Caribbean cardinalfish for a reef tank, especially one with a shadowy cave. Nocturnal.

Vertebrata; Actinopterygii; Perciformes; Apogonidae

Barred Cardinalfish ***Apogon binotatus***

13 cm (5.1 in.) Caribbean

Aquascaping Does best with caves and crevices for hiding.

Feeding Carnivorous; accepts many substitute foods. Needs a varied diet enriched with color enhancers (carotenoids) and vitamins to keep its red color.

Compatibility Reef safe, but likely to eat ornamental shrimps. May be successfully kept in groups in a large aquarium.

An interesting red cardinalfish that will hover in the shadows of a cave or under a ledge while the tank is brightly lit. Nocturnal.

Vertebrata; Actinopterygii; Perciformes; Apogonidae

Redstriped Cardinalfish ***Apogon margaritophorus***

8 cm (3.1 in.) Indo-Australian Archipelago

- **Aquascaping** Does best with caves and crevices for hiding.
- **Feeding** Carnivorous; accepts many substitute foods. Needs a varied diet enriched with color enhancers (carotenoids) and vitamins to keep its bright colors.
- **Compatibility** Reef safe, but likely to eat shrimps and other small crustaceans. Best kept in groups of several specimens.

One of many cardinalfish species that populate coral reefs, this is a small, fairly peaceful fish. Hardy and easy to keep.

Vertebrata; Actinopterygii; Perciformes; Apogonidae

Pajama Cardinalfish ***Sphaeramia nematoptera***

8 cm (3.1 in.) Indo-Pacific; Malaysia to Micronesia

■ **Feeding** Carnivorous; accepts many substitute foods.

■ **Compatibility** Reef safe, but likely to eat shrimps and polychaete worms. Best kept in groups of several specimens or in pairs.

A marine aquarium favorite—exotic color scheme, hardy, and peaceful. Reported to spawn regularly in some reef systems. This mouthbrooder often spawns in captivity.

Vertebrata; Actinopterygii; Perciformes; Apogonidae

Orbiculate Cardinalfish ***Sphaeramia orbicularis***

12 cm (4.7 in.) Indo-Pacific; East Africa to Micronesia

Feeding Carnivorous; accepts many substitute foods.

Compatibility Reef safe, but likely to eat shrimps and polychaete worms. Best kept in groups of several specimens or in pairs.

This is a rather plain cardinalfish, but hardy and peaceful. Looks its best when kept in large schools.

Vertebrata; Actinopterygii; Perciformes; Apogonidae

Banggai Cardinalfish ***Pterapogon kauderni***

7.5 cm (2.9 in.) Indonesia

Compatibility Reef safe. Excellent schooling fish for large aquariums. In smaller tanks, keep singly or in mated pairs, as aggression between species members is likely to become a problem.

Feeding Carnivorous; accepts many substitute foods.

Conservation A possible candidate for overexploitation, as it is in high demand and collected only in a very small geographical area.

A beautiful species for reef aquariums, and one that can easily be bred in the home aquarium. Ask for captive-bred specimens.

Vertebrata; Actinopterygii; Perciformes; Malacanthidae

Golden Tilefish ***Hoplolatilus luteus***

14 cm (5.5 in.) Indonesia

- **Aquascaping** Should have a large, open area of sandy substrate and a covered aquarium to prevent it from jumping out.
- **Feeding** Needs frequent feedings of zooplankton-type meaty foods. Can be difficult to convert to nonliving foods.
- **Compatibility** Reef safe, but likely to eat small crustaceans. May chase and harass smaller plankton-feeding fishes.

A streamlined fish that swims fast and jumps with little provocation, this genus is somewhat delicate in captivity. For experienced aquarists.

Vertebrata; Actinopterygii; Perciformes; Malacanthidae

Purple Tilefish ***Hoplolatilus purpureus***

15 cm (5.9 in.) Indo-west-Pacific

- **Aquascaping** Should have a large, open area of sandy substrate and a covered aquarium to prevent it from jumping out.
- **Feeding** Needs frequent feedings of zooplankton-type meaty foods. Can be difficult to convert to nonliving foods.
- **Compatibility** Reef safe, but likely to eat small crustaceans. May chase and harass smaller plankton-feeding fishes.

A shy fish with great swimming and jumping talents, it is somewhat delicate in captivity. For experienced aquarists only.

Vertebrata; Actinopterygii; Perciformes; Lutjanidae

Emperor Snapper ***Lutjanus sebae***

80 cm (31 in.) Indo-Pacific

Aquascaping Needs plenty of open swimming space as well as some secluded caves or hiding places.

Feeding Carnivorous; readily accepts most meaty foods.

Compatibility Not safe with most smaller reef fishes and crustaceans. Its large size will strain water quality in its system.

This is a big, spectacular show fish for a very large (2,000 L [520 gal.] or larger) fish-only reef tank. Juveniles (photo) can be kept in smaller quarters in groups, but adults will fight except in huge systems.

Vertebrata; Actinopterygii; Perciformes; Lutjanidae

Black Snapper ***Macolor niger***

65 cm (25 in.) Indo-Pacific

Aquascaping Needs plenty of open swimming space as well as some secluded caves or hiding places.

Feeding Carnivorous; readily accepts most meaty foods.

Compatibility Not safe with most smaller reef fishes and crustaceans. Its large size will strain water quality in its system.

Cute and colorful as a juvenile (photo), but a fish that turns quite dull as it gets older. Best avoided unless you have particular interests in the species.

Vertebrata; Actinopterygii; Perciformes; Haemulidae

Harlequin Sweetlips ***Plectorhinchus chaetodonoides***

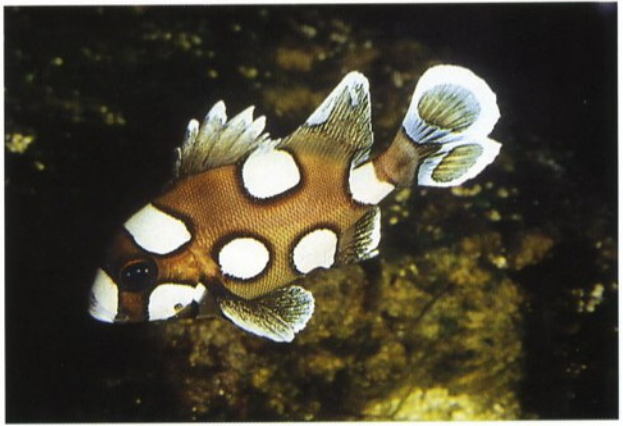
70 cm (27 in.) Widespread in the Indo-Pacific

Aquascaping Needs plenty of open swimming space.

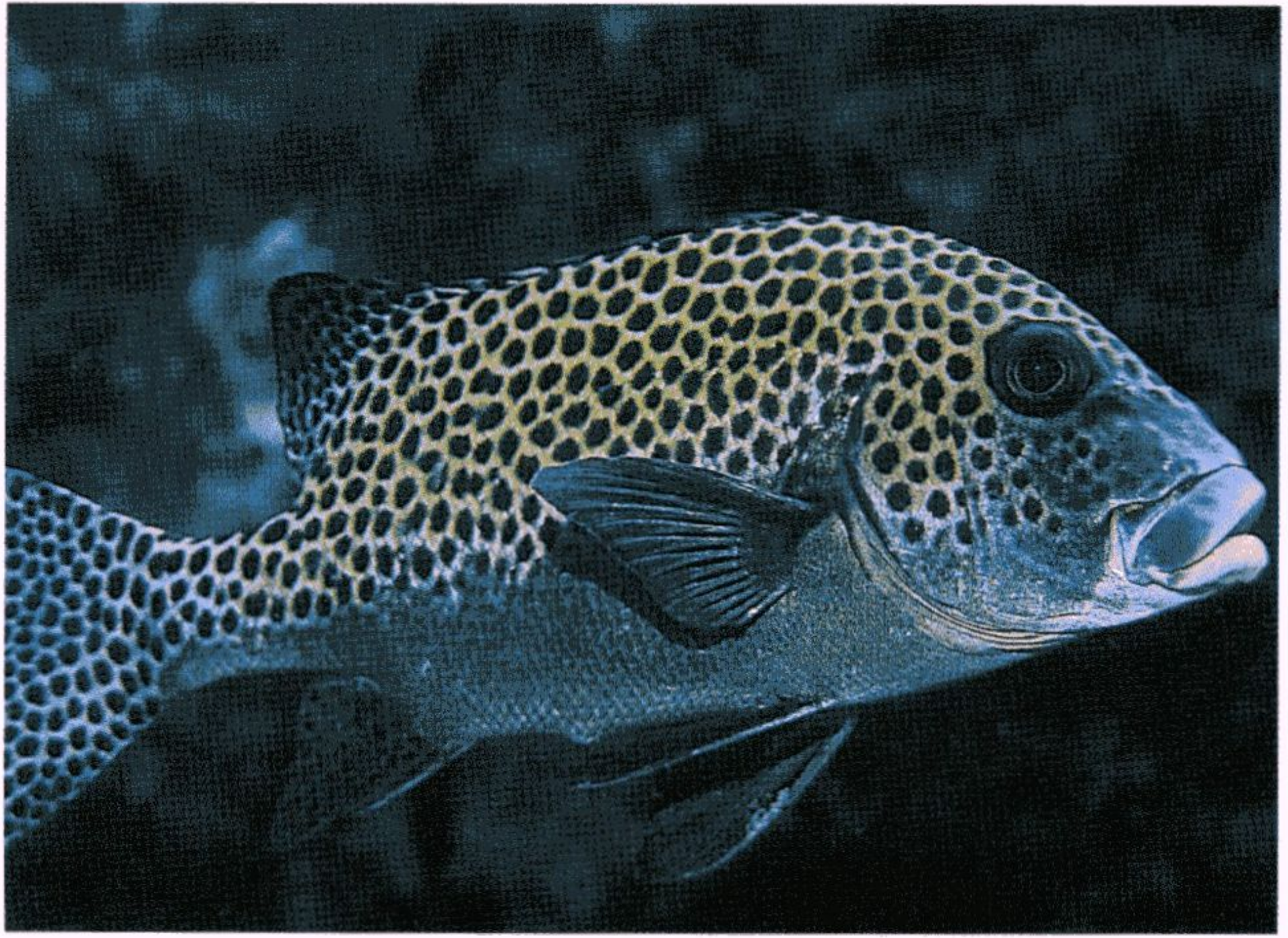
Feeding Carnivorous; accepts fresh or frozen crustaceans and fishes. Live foods may be needed to initiate feeding in juveniles.

Compatibility Too large and predatory for most reef tanks, although it will ignore corals. Its adult size will strain water quality.

A showstopper with an intriguing, paddlelike swimming motion as a juvenile (photo). Adults are large and not so charming. Difficult to acclimate and feed. Not for beginners.



Juvenile Harlequin Sweetlips (*Plectorhinchus chaetodonoides*) is a perfect example of a fish that has immediate appeal to aquarists, but it is not easy to feed and grows into the brute shown below.



Adult Harlequin Sweetlips (*Plectorhinchus chaetodonoides*) is the mature version of the juvenile above. It grows to 70 cm (27 in.).

Vertebrata; Actinopterygii; Perciformes; Haemulidae

Twostriped Sweetlips ***Plectorhinchus albovittatus***

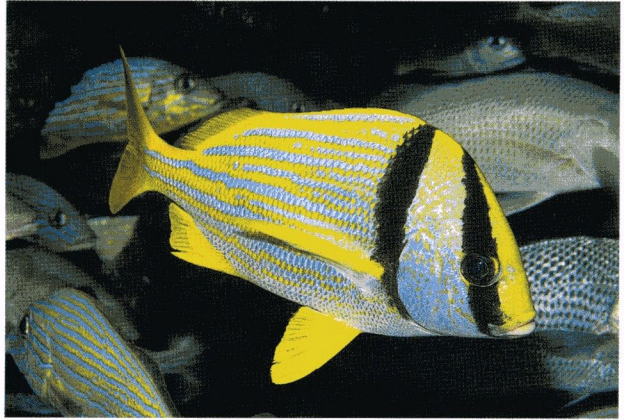
30 cm (11.7 in.) Widespread in the Indo-Pacific

Aquascaping Needs plenty of open swimming space.

Feeding Carnivorous; accepts fresh or frozen meaty foods, especially crustaceans and fish meat.

Compatibility Safe with corals, but grows rather large and digs through the substrate in search of worms, crustaceans, mollusks, and echinoderms. May also eat small fishes.

Bright and interesting as a juvenile (photo), but much less spectacular with advancing age.



Vertebrata; Actinopterygii; Perciformes; Haemulidae

Porkfish ***Anisotremus virginicus***

40 cm (15.6 in.) Western Atlantic

Aquascaping Needs plenty of open swimming space.

Feeding Meaty foods, e.g. crustaceans and fish meat; fresh or frozen. Accepts many substitute foods.

Compatibility Will eat many kinds of worms, crustaceans, mollusks, and echinoderms. May also eat small fishes.

A handsome member of the grunt family, which is a most important group of food fishes from the reef. This is an interesting species for large fish tanks only. Makes distinctive underwater grunting sounds.

Vertebrata; Actinopterygii; Perciformes; Nemipteridae

Twoline Spinecheek ***Scolopsis bilineatus***

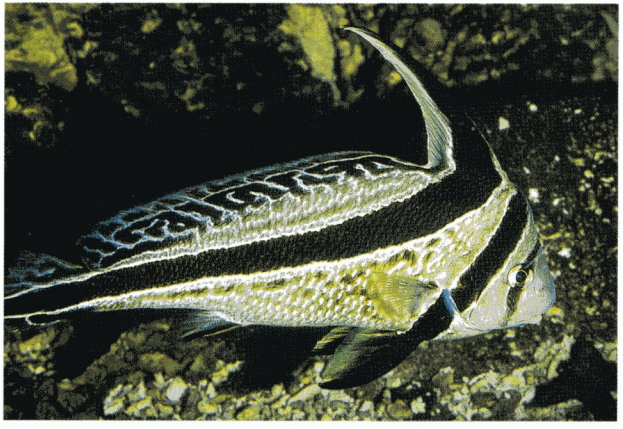
23 cm (9 in.) Indo-west-Pacific

Aquascaping Requires an area of deep (minimum 5 cm [2 in.]) sandy substrate for digging.

Feeding Meaty foods, e.g. crustaceans and fish meat; fresh or frozen. Accepts many substitute foods.

Compatibility Safe with corals, but will eat worms, crustaceans, mollusks, and echinoderms. Actively forages in the substrate.

A reasonably hardy and pretty species, but grows rather large and is a threat to a number of invertebrates.



Vertebrata; Actinopterygii; Perciformes; Sciaenidae

Jackknife Fish ***Equetus lanceolatus***

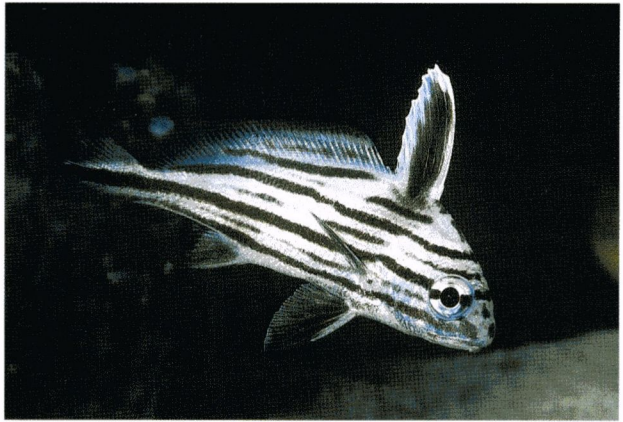
25 cm (9.8 in.) Caribbean

Aquascaping Shy fish that needs many good, shady hiding places. A thick sand bed and live rock will provide live foods.

Feeding Feeds on crustaceans and polychaete worms in the wild. Expect to use live foods only, at least initially.

Compatibility Safe with corals, but will eat various invertebrates and small fishes. Grows too large for most reef systems.

Very unusual, beautiful fish, but a delicate and hard-to-keep species. Needs peaceful surroundings.



Vertebrata; Actinopterygii; Perciformes; Sciaenidae

Highhat ***Pareques acuminatus***

23 cm (9 in.) Caribbean

Aquascaping Shy fish that needs many good, shady hiding places. A thick sand bed and live rock provide live, natural foods.

Feeding Feeds on crustaceans and polychaete worms in the wild. Expect to use live foods only, at least initially.

Compatibility Safe with corals, but will eat various invertebrates and small fishes. Grows too large for most reef systems

An interesting Caribbean species, and not quite as delicate and demanding as the related Jackknife Fish. Needs peaceful surroundings.

Vertebrata; Actinopterygii; Perciformes; Mullidae

Bicolor Goatfish ***Parupeneus barberinoides***

25 cm (9.8 in.) Western Pacific

Aquascaping Needs plenty of thick, soft substrate for digging.

Feeding Feeds on benthic invertebrates, such as worms and crustaceans. Substitute meaty foods are often accepted, but appropriate nutrition in captivity is often a problem.

Compatibility Safe with corals. Will eat bottom-dwelling invertebrates, worms, and crustaceans, and occasionally smaller fishes.

An appealing fish that grovels in the sand, but surprisingly difficult to feed and keep. For experienced aquarists only.

Vertebrata; Actinopterygii; Perciformes; Mullidae

Yellowsaddle Goatfish ***Parupeneus cyclostomus***

50 cm (19.5 in.) Indo-Pacific, Red Sea

Aquascaping Needs ample swimming space. (1,000 L [260 gal.])

Feeding Carnivorous; adapts to a diet of meaty aquarium foods more readily than most of its goatfish relatives.

Compatibility Will eat smaller fishes. Free living invertebrates, e.g., shrimps are also not safe.

Unlike most goatfishes, this species is not a substrate sifter and seems to feed on small fishes in the wild. Easier to keep than other goatfishes, but grows far too large for most tanks.

Vertebrata; Actinopterygii; Perciformes; Mullidae

Blackstriped Goatfish ***Upeneus tragula***

28 cm (10.9 in.) Indo-Pacific

Aquascaping Needs plenty of thick, soft substrate for digging.

Feeding Feeds on benthic invertebrates, such as worms and crustaceans. Substitute meaty foods are often accepted, but appropriate nutrition in captivity is often a problem.

Compatibility Safe with corals. Will eat bottom-dwelling invertebrates, worms, and crustaceans, and occasionally smaller fishes.

An industrious forager and interesting to watch, but hard to keep. For experienced aquarists with large systems.

Vertebrata; Actinopterygii; Perciformes; Ephippidae

Orbiculate Batfish ***Platax orbicularis***

57 cm (22 in.) Indo-Pacific

Aquascaping Adults will need plenty of swimming space.

Feeding Carnivorous; accepts various meaty foods.

Compatibility Not reef safe. May feed on or damage sponges, corals, other invertebrates, and small fishes.

Fairly peaceful, and reasonably hardy in comparison to other batfishes. Grows very fast and demands a very large aquarium, minimum 1,000 liters (260 gal.).

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Threadfin Butterflyfish ***Chaetodon auriga***

23 cm (9 in.) Indo-Pacific, Red Sea

■ **Aquascaping** Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.

■ **Feeding** Carnivorous; accepts most meaty foods.

■ **Compatibility** Not reef safe. Will eat and damage a large number of sessile invertebrates, including corals.

Among the hardiest butterflyfishes, but generally not suitable for invertebrate tanks. (A Red Sea subspecies lacks the black spot on its dorsal fin.) Good beginner's butterfly.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Collare Butterflyfish ***Chaetodon collare***

16 cm (6.2 in.) Indo-Pacific

■ **Aquascaping** Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.

■ **Feeding** Feeds on stony coral polyps and small invertebrates in the wild. May accept fresh or frozen crustaceans (shrimps) and fish meat. Often difficult to feed.

■ **Compatibility** Not reef safe. Will eat stony coral polyps, although soft corals appear to be safe under most circumstances.

A classic butterflyfish—exceptionally handsome but hard to feed.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Foureye Butterflyfish ***Chaetodon capistratus***

15 cm (5.9 in.) Caribbean, Western Tropical Atlantic

Aquascaping Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.

Feeding In nature, it feeds on zoanthids, gorgonians, tunicates, worms, and other invertebrates. Usually refuses substitute foods.

Compatibility Not reef safe.

A common and familiar Caribbean species that survives poorly in the aquarium. Only for very experienced aquarists who are able to put effort into experimental husbandry techniques.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Blackback Butterflyfish ***Chaetodon melannotus***

15 cm (5.9 in.) Indo-west-Pacific

Aquascaping Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.

Feeding Feeds on soft coral polyps in the wild, but substitute meaty foods are normally accepted. Feed several times daily.

Compatibility Not reef safe. Will eat and damage soft and stony corals. Aggressive toward its own species.

Among the hardiest of butterflyfishes, but generally not suitable for invertebrate tanks.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Klein's Butterflyfish ***Chaetodon kleinii***

13 cm (5.1 in.) Indo-Pacific

Aquascaping Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.

Feeding Appears to have different food preferences, depending on its geographic origin. Meaty foods are readily accepted.

Compatibility Some specimens are reef safe. Most will not actively eat corals, but some may pick at soft corals.

Among the more hardy of the butterflyfishes, sometimes introduced to prey on *Aiptasia* spp. anemones. Needs vigilance in a reef tank.

The Blue Cheeked Butterfly Fish (Chaetodon semilarvatus)

This typical reef dweller with its exceptionally attractive shape and coloration is ***unique to the Red Sea.*** *It is one of the world's largest Butterfly Fish and can usually be seen foraging on the reef in pairs or in small groups.*

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Orangeface Butterflyfish ***Chaetodon larvatus***

12 cm (4.7 in.) Red Sea

- **Feeding** This fish is an obligate corallivore—it feeds primarily on live coral polyps. Nearly impossible to adapt to substitute foods.
- **Compatibility** Not reef safe. Will eat and damage corals.
- **Conservation** Not suitable for aquarium keeping with currently known husbandry methods. Should not be collected or purchased.

One of the beautiful butterflyfishes that aquarists need to avoid. Very difficult to keep.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Eightbanded Butterflyfish ***Chaetodon octofasciatus***

12 cm (4.7 in.) Indo-west-Pacific

- **Feeding** This fish is an obligate corallivore—it feeds primarily on live coral polyps. Nearly impossible to adapt to substitute foods.
- **Compatibility** Not reef safe. Will eat and damage corals.
- **Conservation** Not suitable for aquarium keeping with currently known husbandry methods. Should not be collected or purchased.

One of the beautiful butterflyfishes that aquarists need to avoid. Very difficult to keep.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Indian Ocean Redfin Butterflyfish ***Chaetodon trifasciatus***

15 cm (5.9 in.) Red Sea and Indian Ocean

- **Feeding** This fish is an obligate corallivore—it feeds primarily on live coral polyps. Near impossible to adapt to substitute foods.
- **Compatibility** Not reef safe. Will eat and damage corals.
- **Conservation** Not suitable for aquarium keeping with currently known husbandry methods. Should not be collected or purchased.

Like its sibling, the Pacific Redfin Butterflyfish (*Chaetodon lunulatus*), this is a very difficult species to keep.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Yellowtail Butterflyfish ***Chaetodon xanthurus***

14 cm (5.5 in.) Western Pacific

Aquascaping Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.

Feeding In the wild, eats crustaceans, worms, and other free living invertebrates. Many substitute meaty foods are readily accepted.

Compatibility Not perfectly reef safe. Most specimens will not actively eat corals, but are likely to pick at them, causing damage.

One of the reasonably hardy butterflyfishes, attractive and a possible choice for keeping with soft corals of the more noxious species.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Copperband Butterflyfish ***Chelmon rostratus***

20 cm (7.8 in.) Indo-west-Pacific

- **Aquascaping** Well-established live rock needed.
- **Feeding** In nature, eats crustaceans and other benthic invertebrates. May accept substitute foods, but can be difficult to feed.
- **Compatibility** Generally reef safe, but may pick at corals, colonial anemones, and worms.

One of the unpredictable butterflyfishes, very handsome and hardy in some instances, but often prone to starving for lack of live food. Sometimes introduced as a predator on small nuisance anemones.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Big Longnose Butterflyfish ***Forcipiger longirostris***

22 cm (8.9 in.) Indo-Pacific

- **Aquascaping** Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.
- **Feeding** In the wild, feeds on crustaceans, worms, and other benthic invertebrates. Substitute foods may be accepted.
- **Compatibility** Generally reef safe. Will occasionally pick at corals.

A somewhat delicate species, best for experienced aquarists. Similar to *F. flavissimus*, but with a longer snout, black edged scales on the belly, and a totally black eye.

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Yellow Longnose Butterflyfish ***Forcipiger flavissimus***

22 cm (8.9 in.) Indo-Pacific

- **Aquascaping** Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.
- **Feeding** The mouth of this species is adapted for feeding on corals and other invertebrates. Accepts many substitute foods.
- **Compatibility** Not reef safe. Likely to damage corals.

A showy species and one of the more hardy butterflyfishes. Not a good tankmate with most corals, except possibly the noxious soft coral species (*Sinularia*, *Litophyton*). Compare to *F. longirostris* (above).

Vertebrata; Actinopterygii; Perciformes; Chaetodontidae

Longfin Bannerfish ***Heniochus acuminatus***

20 cm (7.8 in.) Indo-west-Pacific

Aquascaping Well-established live rock provides natural surroundings and a variety of food organisms for butterflyfishes.

Feeding In nature, feeds on zooplankton and benthic invertebrates. Accepts many types of substitute meaty foods.

Compatibility Not reef safe. Will pick at various sessile invertebrates.

Among the more hardy butterflyfishes, and one that can be kept in schools. The similar Schooling Bannerfish (*H. diphreutes*) is reef safe.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Flagfin Angelfish ***Apolemichthys trimaculatus***

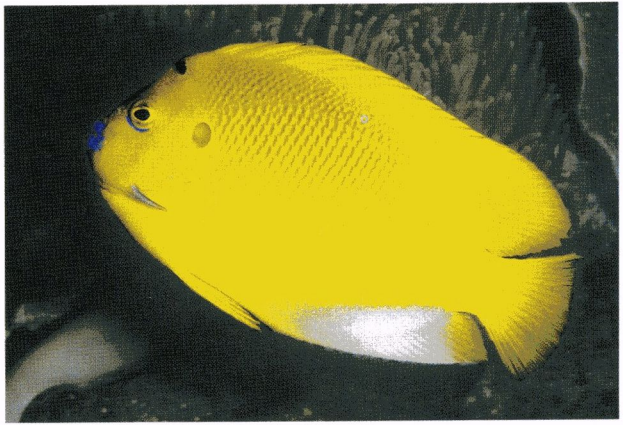
25 cm (9.8 in.) Indo-west-Pacific

Aquascaping Live rock provides natural surroundings and a source of live food organisms for all angelfishes.

Feeding Feeds primarily on sponges and tunicates. Often difficult, but not impossible, to adapt to substitute foods.

Compatibility Not reef safe. Will usually eat or nip at corals and other sessile invertebrates.

A rather delicate and challenging species. Best reserved for experienced aquarists.



Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Goldenflake Angelfish ***Apolemichthys xanthopunctatus***

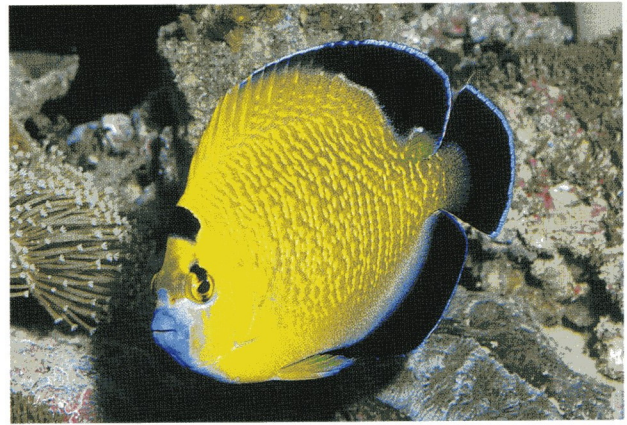
25 cm (9.8 in.) Central Pacific

Aquascaping Live rock will provide this fish with natural surroundings and a source of live food organisms.

Feeding A specialized sponge feeder that is difficult to adapt to substitute foods.

Compatibility Not reef safe. Will usually eat or nip at corals and other sessile invertebrates.

Sadly, a difficult species to keep. Suitable for advanced aquarists able to invest time and effort in experimental husbandry techniques.



Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Cherub Angelfish ***Centropyge argi***

8 cm (3.1 in.) Tropical Western Atlantic

■ **Aquascaping** Live rock will provide this fish with natural surroundings and a source of live food organisms.

■ **Feeding** Grazes on algae and tiny benthic invertebrates. Accepts a variety of substitute meaty and algae-based foods in the aquarium.

■ **Compatibility** Generally reef safe. May occasionally nip at some coral species. Can be very aggressive toward its own species.

One of the best aquarium species among the dwarf angelfishes of the genus *Centropyge*. Will form pairs and spawn in captivity.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Bicolor Angelfish ***Centropyge bicolor***

15 cm (5.9 in.) Indo-west-Pacific

■ **Aquascaping** Live rock will provide this fish with natural surroundings and a source of live food organisms.

■ **Feeding** Grazes on algae and tiny benthic invertebrates. Accepts a variety of substitute meaty and algae-based foods.

■ **Compatibility** Not reef safe. Will usually eat or nip at corals and other sessile invertebrates, including *Tridacna* spp. clams.

Hardy and beautiful species if properly collected, but it can be a major threat to invertebrates.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Coral Beauty ***Centropyge bispinosus***

10 cm (3.9 in.) Widely distributed in the Indo-Pacific

■ **Aquascaping** Live rock provides natural surroundings and a source of live food organisms.

■ **Feeding** Grazes on algae and tiny benthic invertebrates. Accepts a variety of substitute meaty and algae-based foods.

■ **Compatibility** Generally reef safe. May nip at sessile invertebrates, but is often kept with corals without any noticeable ill effects.

A fine little angelfish that lives up to its name and is one of the best aquarium species in the genus. Usually safe with corals.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Flame Angelfish ***Centropyge loriculus***

12 cm (4.7 in.) Pacific

■ **Aquascaping** Live rock provides natural surroundings and a source of live food organisms.

■ **Feeding** Grazes on algae and tiny benthic invertebrates. Accepts a variety of substitute meaty and algae-based foods.

■ **Compatibility** Not always reef safe. Can turn destructive in some reef tanks. Often aggressive toward its own and related species.

A beautiful and fairly hardy species, but it can be a major threat to invertebrates and a bully with more delicate fishes.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Multibarred Angelfish ***Paracentropyge multifasciatus***

10 cm (3.9 in.) Indo-west-Pacific

Aquascaping This shy species requires caves and crevices for refuge, as well as live rock as a source of live food organisms.

Feeding Natural diet is largely unknown; possibly sponges, algae and tiny benthic invertebrates. Very difficult to feed in the aquarium. Does not readily accept substitute foods.

Compatibility Not fully reef safe, but will ignore most soft corals.

A very pretty fish, but shy, hard to feed, and with poor chances of survival. For experienced aquarists with appropriate systems or new experimental husbandry techniques.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Scribbled Angelfish ***Chaetodontoplus duboulayi***

25 cm (9.8 in.) NE Australia, Papua New Guinea

■ **Aquascaping** Live rock provides natural surroundings and a source of live food organisms.

■ **Feeding** In nature, grazes on sponges and algae. Accepts a variety of substitute foods in the aquarium.

■ **Compatibility** Not completely reef safe. May eat or nip at corals and other sessile invertebrates.

Fairly hardy species that adapts well to aquarium life. Many aquarists report success with this species in large, coral-filled reef tanks.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Vermiculated Angelfish ***Chaetodontoplus mesoleucus***

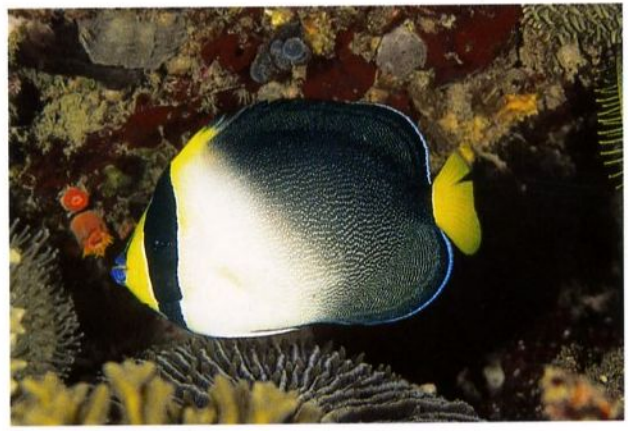
17 cm (6.6 in.) Western Pacific

Aquascaping Needs well-established live rock for hiding places and to provide a source of algae and live food organisms.

Feeding In nature, eats sponges, other sessile invertebrates, and algae. Usually—but not always—accepts substitute foods.

Compatibility Not reef safe. Likely to pick at many coral species, like zoanthids, as well as clams and other sessile invertebrates.

A hardy species for some aquarists, a challenge for others. Many individuals adapt well to aquarium life, others hide and refuse to eat.



Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Blackspot Angelfish ***Genicanthus melanospilos***

20 cm (7.8 in.) Indo-Pacific

- **Aquascaping** Active fish that needs plenty of swimming space.
- **Feeding** Eats large zooplankton in the wild. Often difficult to adapt to substitute foods. Should be fed several times per day.
- **Compatibility** Reef safe. Can be very aggressive toward its own species and related species. Keep singly, or, in large systems, in male-female pairs or groups with only one male. (*Female at right.*)

An excellent, unusual angelfish for reef aquariums, but not among the easiest angelfishes to keep. For experienced aquarists.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Watanabe's Angelfish ***Genicanthus watanabei***

18 cm (7 in.) Western Pacific

- **Aquascaping** Active fish that needs plenty of swimming space.
- **Feeding** Eats large zooplankton in the wild. Often difficult to adapt to substitute foods. Should be fed several times per day.
- **Compatibility** Reef safe. Can be very aggressive toward its own species and related species. Keep singly, or, in large systems, in male-female pairs or groups with only one male. (*Male at right.*)

Like others in this genus, very attractive and absolutely reef safe, but needs the feeding and care of an experienced aquarist.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Regal Angelfish ***Pygoplites diacanthus***

25 cm (9.8 in.) Indo-Pacific

■ **Aquascaping** Must have a tank with well-established live rock, providing natural hiding places and a source of live food organisms.

■ **Feeding** Typically feeds on sponges, tunicates, and other sessile invertebrates. Some individuals refuse to accept aquarium foods.

■ **Compatibility** Not fully reef safe. May pick at corals, clams, and other sessile invertebrates. Still some aquarists report success with this species in large coral tanks. (*Australian morph at left.*)

A prized species, but demanding of experienced care and feeding.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Queen Angelfish ***Holacanthus ciliaris***

45 cm (17.6 in.) Caribbean to Central Atlantic

■ **Aquascaping** Live rock provides natural surroundings and a source of live food organisms.

■ **Feeding** A sponge feeder in the wild, but young specimens readily accept a variety of substitute foods in the aquarium.

■ **Compatibility** Not reef safe. Can be very aggressive toward its own species and related or similar looking fishes.

Beautiful and hardy species, but grows far too large for most home tanks. Suitable as a show fish in very large tanks.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Rock Beauty ***Holacanthus tricolor***

20 cm (7.8 in.) Tropical Western Atlantic

■ **Aquascaping** Live rock provides natural surroundings and a source of live food organisms.

■ **Feeding** Eats sponges in the wild, and very difficult to switch to substitute foods in the aquarium. Offer sponge-based rations.

■ **Compatibility** Not reef safe. Will usually eat or nip at corals and other sessile invertebrates.

A Caribbean beauty, but difficult to feed. For experienced aquarists willing to put effort into experimental husbandry techniques.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Gray Angelfish ***Pomacanthus arcuatus***

50 cm (19.5 in.) Tropical Western Atlantic

■ **Aquascaping** Live rock provides natural surroundings and a source of live food organisms.

■ **Feeding** In nature it feeds on sponges and other sessile invertebrates. Accepts a variety of substitute foods in the aquarium.

■ **Compatibility** Not reef safe. Will usually eat or nip at corals and other sessile invertebrates.

An elegant, hardy species, but far too large for most aquariums. Suitable as a show fish in very large tanks.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

French Angelfish ***Pomacanthus paru***

38 cm (14.8 in.) Caribbean to West Africa

Aquascaping Live rock provides natural surroundings and a source of live food organisms.

Feeding Mostly sponges, but also other sessile invertebrates and algae. Accepts a variety of substitute foods in the aquarium.

Compatibility Not reef safe. Will usually eat or nip at corals and other sessile invertebrates. Often aggressive toward similar fishes.

A famously hardy and beautiful species suitable for a large tank with live rock, fishes, and rugged invertebrates. (*Subadult shown at right.*)

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Blue-ring Angelfish ***Pomacanthus annularis***

30 cm (11.7 in.) Indo-west-Pacific

■ **Aquascaping** Live rock provides natural surroundings and a source of live food organisms.

■ **Feeding** In nature it eats sponges, tunicates, other sessile invertebrates, and algae. Readily accepts a variety of aquarium foods.

■ **Compatibility** Not reef safe. Will usually eat or nip at corals and other sessile invertebrates. Often aggressive toward similar fishes.

An exotic-looking but hardy species suitable for a large fish tank with other robust species.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Emperor Angelfish ***Pomacanthus imperator***

40 cm (15.6 in.) Indo-Pacific

- **Aquascaping** Does best in systems with establish live rock decor.
- **Feeding** Eats sponges, various invertebrates, and algae in the wild. Needs a varied diet with enriched foods for maintenance of good health and vivid coloration.
- **Compatibility** Not reef safe, but some aquarists report success with this species in large coral tanks.

A spectacular fish that is quite hardy and suited to large tanks with robust tankmates. May be safe with some corals.

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Majestic Angelfish ***Pomacanthus navarchus***

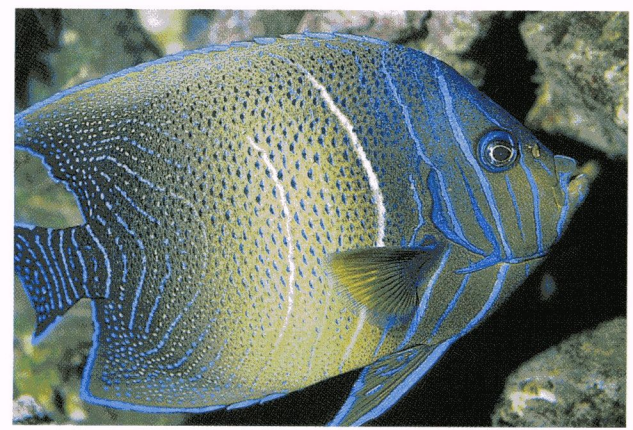
25 cm (9.8 in.) Indo-Australian Archipelago

Aquascaping Live rock provides natural surroundings and a source of live food organisms.

Feeding In nature it eats, sponges, tunicates, other sessile invertebrates, and algae. Can be difficult to feed in the aquarium.

Compatibility Not reef safe. Will usually eat or nip at corals and other sessile invertebrates. Avoid keeping with aggressive fishes.

This is a rather shy species and not among the easiest angelfishes to keep. Needs a varied diet and experienced care.



Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Koran Angelfish ***Pomacanthus semicirculatus***

40 cm (15.6 in.) Indo-Pacific

Aquascaping Live rock is excellent decor for tanks with angelfishes, providing natural surroundings and a variety of food organisms.

Feeding In the wild, eats sponges, tunicates, other sessile invertebrates, and algae. Readily accepts a variety of aquarium foods.

Compatibility Not reef safe. Often aggressive toward other fishes.

This is a hardy, attractive species suitable for a large fish tank with other robust species. (Subadult shown at left.)

Vertebrata; Actinopterygii; Perciformes; Pomacanthidae

Blueface Angelfish ***Pomacanthus xanthometopon***

38 cm (14.8 in.) Indo-west-Pacific

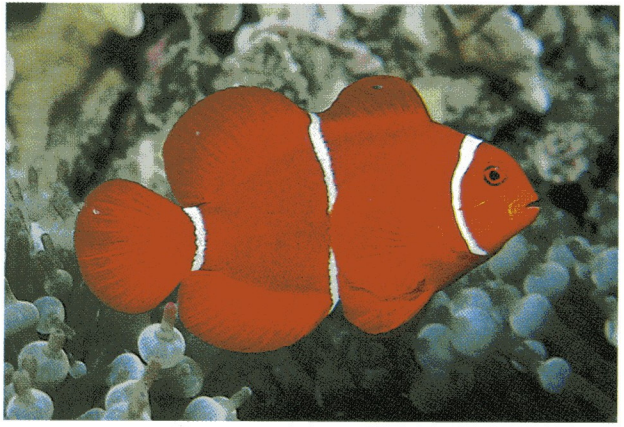
Aquascaping Live rock provides excellent natural surroundings and a variety of food organisms for all angelfishes.

Feeding In the wild, eats sponges, tunicates, other sessile invertebrates, and algae. May be slow to accept substitute foods.

Compatibility Not reef safe. Not as aggressive as other large angelfishes.

A coveted species, but not among the easiest angelfishes to keep. A fish suited to more experienced aquarists.

Many grazing fishes, such as this large adult Blueface Angelfish (*Pomacanthus xanthometopon*), show higher survival rates and better acclimation to captivity in aquariums with well-establish live rock aquascaping that provides both cover and live prey items. On the other hand, a large grazer such as this can decimate desirable plant and invertebrate life in a typical reef aquarium.



Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Maroon Anemonefish ***Premnas biaculeatus***

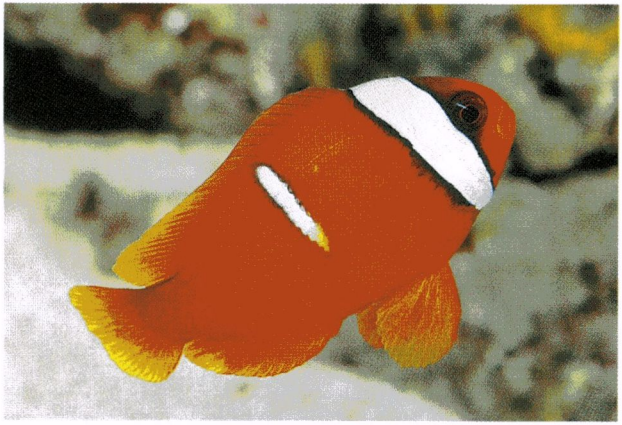
13 cm (5.1 in.) Indo-Australian Archipelago and Western Pacific

Aquascaping Best kept with the Bubble Tip Sea Anemone (page 111), but will thrive without a host anemone.

Feeding Omnivore; readily accepts a variety of meaty and algae-based foods. Color-enhancing rations help maintain bright colors.

Compatibility Reef safe. Very aggressive toward anemonefishes and similar species. Keep singly, in pairs, or in groups of one large female and several small males—introduce all simultaneously.

An excellent fish for reef tanks, but may bully shy and delicate fishes.



Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Tomato Anemonefish ***Amphiprion frenatus***

11 cm (4.3 in.) Indo-Australian Archipelago and Western Pacific

■ **Aquascaping** Best kept with the Bubble Tip Sea Anemone (page 111), but will thrive without a host anemone.

■ **Feeding** Omnivore; readily accepts a variety of meaty and algae-based foods. Color-enhancing rations help maintain bright colors.

■ **Compatibility** Reef safe. Very aggressive toward anemonefishes and similar species. Keep singly, in pairs, or in groups of one large female and several small males—introduce all simultaneously.

A bright, very hardy species, ideally suited for reef aquariums.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Clark's Anemonefish ***Amphiprion clarkii***

14 cm (5.5 in.) Widespread in the Indo-Pacific

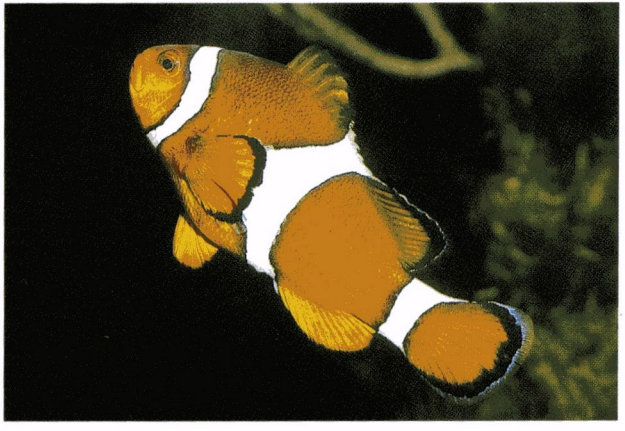
- **Aquascaping** Best kept with one of many species of large sea anemones. Will also thrive without an anemone.
- **Feeding** Omnivore; readily accepts a variety of meaty and algae-based foods. Color-enhancing rations help maintain bright colors.
- **Compatibility** Reef safe. Very aggressive toward anemonefishes and similar species. Keep singly, in pairs, or in groups of one large female and several small males—introduce all simultaneously.

A great fish for reef tanks, but may bully shy and delicate fishes.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Ocellaris Anemonefish ***Amphiprion ocellaris***

8 cm (3.1 in.) Indo-Pacific



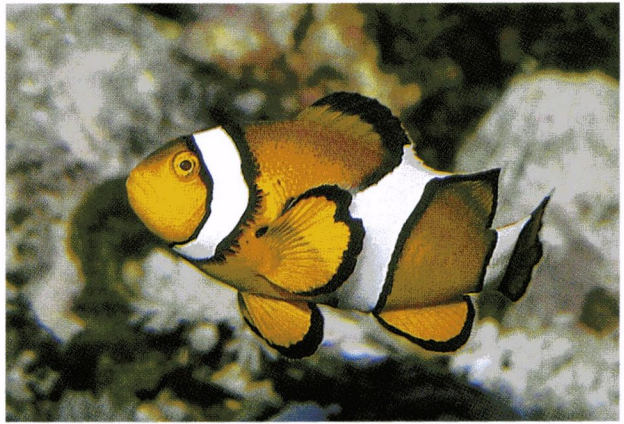
- **Aquascaping** Display with a large sea anemone, e.g., *Heteractis magnifica, Stichodactyla gigantea, S. mertensii*. Also thrives without.
- **Feeding** Omnivore; readily accepts a variety of meaty and algae-based foods. Color-enhancing rations help maintain bright colors.
- **Compatibility** Reef safe and peaceful. May be kept in groups. Introduce all simultaneously.

The perfect reef aquarium fish. Wild-caught specimens tend to be difficult to adapt to captivity. Captive-breds are generally very hardy.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Percula Anemonefish ***Amphiprion percula***

7 cm (2.7 in.) Western Pacific



■ **Aquascaping** Makes a great display with a large sea anemone. Prefers *Heteractis magnifica, Stichodactyla gigantea*, and *S. mertensii*. Will also thrive without a host anemone.

■ **Feeding** Omnivore; readily accepts a variety of meaty and algae-based foods. Color-enhancing rations help maintain bright colors.

■ **Compatibility** Reef safe and very peaceful. May be kept in groups, pairs, or singly. Introduce all simultaneously.

Peaceful and ideal for reef aquariums. Captive-breds are hardy.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Pink Skunk Anemonefish ***Amphiprion perideraion***

8 cm (3.1 in.) Indo-west-Pacific

■ **Aquascaping** Makes a great display with a large sea anemone. Prefers *Heteractis magnifica, H. crispa, Macrodactyla doreensis,* and *Stichodactyla gigantea.* Will also thrive without an anemone.

■ **Feeding** Omnivore; readily accepts a variety of meaty and algae-based foods. Color-enhancing rations help maintain bright colors.

■ **Compatibility** Reef safe and peaceful. Keep singly, in pairs, or in groups consisting of one large female and several small males, introduced simultaneously.

A delicately colored fish that is ideally suited for reef aquariums.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Blue Chromis ***Chromis cyanea***

10 cm (3.9 in.) Caribbean

Feeding Omnivore; constantly plucks zooplankton from the water column in the wild. Needs meaty foods, such as fresh or frozen *Mysis* and brine shrimp, or high-protein flakes, at least several times per day.

Compatibility Reef safe. Should be kept in schools of 7 or more.

Glittering, peaceful fish that looks highly spectacular in large schools. Can be rather difficult to keep because of their feeding demands. Automatic feeders are useful for fishes such as this.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Blue Green Chromis ***Chromis viridis***

9 cm (3.5 in.) Indo-Pacific

Feeding Omnivore; constantly seeks plankton in the water column. Needs meaty foods, such as fresh or frozen *Mysis* and brine shrimp, or high-protein flakes, at least several times per day.

Compatibility Reef safe. Should be kept in schools of 7 or more. Especially appropriate with branching stony corals in which they will seek cover.

Pretty, peaceful fishes that demonstrate interesting schooling behaviors. Automatic feeders are useful for feeding these fish.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Humbug Dascyllus ***Dascyllus aruanus***

7 cm (2.7 in.) Indo-Pacific

Aquascaping Juveniles do best with holes, crevices, or branching *Acropora* or *Pocillopora* corals for hiding.

Feeding Easily fed on a variety of meaty and algae-based foods.

Compatibility Reef safe, but may eat small shrimps. Can be extremely aggressive toward smaller, delicate fishes. Juveniles do well in groups, but adults become very aggressive toward their own kind. Will need a large tank for full-grown specimens.

Extremely hardy fish that will grow into a bully in community tanks.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Reticulate Dascyllus ***Dascyllus reticulatus***

7 cm (2.7 in.) Indo-west-Pacific

■ **Aquascaping** Juveniles do best with holes, crevices, or branching *Acropora* or *Pocillopora* corals for hiding.

■ **Feeding** Easily fed on a variety of meaty and algae-based foods.

■ **Compatibility** Reef safe, but can be extremely aggressive toward smaller, delicate fishes. Juveniles do well in groups, but adults become very aggressive toward their own species.

Cute juveniles tend to grow into big, aggressive adults that can terrorize a whole aquarium. Very hardy.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Threespot Dascyllus ***Dascyllus trimaculatus***

11 cm (4.3 in.) Indo-Pacific

Aquascaping Juveniles will shelter in *Cryptodendrum adhaesivum* anemones if available.

Feeding Easily fed a varied diet of meaty and algae-based foods.

Compatibility Reef safe, but adults are often extremely aggressive toward other fishes. Should be kept singly, or in a mated pair.

Once considered a good, hardy beginner's fish, but its bullying tactics as an adult make it a questionable introduction to a community tank.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Blue Devil ***Chrysiptera cyanea***

6 cm (2.3 in.) Indo-west-Pacific

Aquascaping Will make good use of rocky hiding places.

Feeding Easily fed a varied diet of meaty and algae-based foods.

Compatibility Reef safe. Can be aggressive toward its own species as well as other fishes, especially in small systems. Several can be housed in a large aquarium with a many hiding places.

This stunningly attractive, electric-blue fish is very hardy but can live up to its common name. Has many geographical color morphs, with or without yellow markings on the tail and breast.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Yellowtail Blue Damselfish ***Chrysiptera parasema***

5 cm (2 in.) Western Pacific

■ **Feeding** Easily fed a varied diet of meaty and algae-based foods.

■ **Compatibility** Reef safe. A relatively mild-mannered fish that is a much better choice than many other damsels, especially for small-to-average-size systems. Avoid keeping with aggressive fishes, particularly other damselfishes. Several specimens can be kept together without much trouble.

A beautiful and hardy fish that is far more peaceful than the majority of its relatives. Ideal fish for beginners, and for invertebrate tanks.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Black Damselfish ***Neoglyphidodon melas***

13 cm (5.1 in.) Indo-Pacific

■ **Feeding** Eats soft corals in the wild, but readily accepts meaty and algae-based substitute foods.

■ **Compatibility** Not reef safe. May eat corals. Aggressive toward other fishes. Juveniles can be kept in groups, but adults become extremely aggressive. Keep singly or in mated pairs.

Hardy but aggressive species. This genus has juveniles that are stunningly attractive, but that grow into dull-looking, brownish black adults that will bully most other fishes in a home aquarium.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Golden Damselfish ***Amblyglyphidodon aureus***

10 cm (3.9 in.) Indo-west-Pacific

■ **Aquascaping** Acts most natural with abundant hiding places, such as dense coral growths.

■ **Feeding** Eats plankton in the wild; accepts most substitute foods.

■ **Compatibility** Reef safe. Can be aggressive toward other fishes. May eat small shrimps. Juveniles do well in groups, but adults become aggressive toward their own species.

A hardy damselfish that keeps its lemon-yellow coloration, but grows large and can be somewhat aggressive. Keep with other robust fishes.

Vertebrata; Actinopterygii; Perciformes; Pomacentridae

Giant Damselfish ***Microspathodon dorsalis***

26 cm (10.1 in.) Eastern Pacific

- **Aquascaping** Should have many good hiding places.
- **Feeding** Readily accepts meaty and algae-based foods.
- **Compatibility** Reef safe. Fairly peaceful toward other fishes, but likely to eat small crustaceans and not to be fully trusted with corals. Juveniles may do well in groups, but adults become aggressive toward their own species and should be kept singly.

Quite attractive as juveniles (photo), but adults become dull, grayish brown in overall coloration. Keep with other robust fishes.

Vertebrata; Actinopterygii; Perciformes; Cirrhitidae

Redspotted Hawkfish ***Amblycirrhitus pinos***

8 cm (3.1 in.) Caribbean

Feeding Carnivore; readily accepts most meaty foods.

Compatibility Reef safe. Will eat any fish or crustacean small enough to swallow. Tends to bully other fishes; do not keep with sensitive, docile species. Particularly aggressive toward other hawkfishes.

Fascinating behavior, as it sits perching like a hawk on corals or rocks, waiting for prey. Hardy but extremely voracious.

Vertebrata; Actinopterygii; Perciformes; Cirrhitidae

Pixy Hawkfish ***Cirrhitichthys oxycephalus***

9 cm (3.5 in.) Indo-Pacific, Eastern Pacific, Red Sea

Feeding Carnivore; readily accepts most meaty foods.

Compatibility Reef safe. Will eat any fish or crustacean small enough to swallow. Tends to bully other fishes; do not keep with sensitive, docile species. Particularly aggressive toward other hawkfishes, especially its own species. Keep singly or in mated pairs.

A commonly seen hawkfish, interesting to watch and very hardy, but not to be trusted with small fishes and crustaceans, which it can attack and swallow with amazing speed.

Vertebrata; Actinopterygii; Perciformes; Cirrhitidae

Swallowtail Hawkfish ***Cyprinocirrhites polyactis***

14 cm (5.5 in.) Indo-Pacific

■ **Feeding** Carnivore; accepts most meaty foods offered as zooplankton substitutes.

■ **Compatibility** Reef safe. Much more placid than other hawkfishes, but may eat small ornamental shrimps and may bully delicate fishes. Several specimens may be kept together if they are of nearly identical size and introduced simultaneously.

The only plankton-feeding hawkfish, it will hover in strong currents. Excellent for the reef aquarium, provided suitable food is available.

Vertebrata; Actinopterygii; Perciformes; Cirrhitidae

Flame Hawkfish ***Neocirrhites armatus***

9 cm (3.5 in.) Western Pacific

Feeding Easily fed on all meaty foods.

Compatibility Reef safe with corals, but will eat any fish, snail, or crustacean small enough to swallow. May bully timid fishes. Keep singly, unless a mated pair.

The bright red color and prominent eyes of this fish make it an eye-catching favorite of many aquarists. Fascinating to watch, it perches like a hawk on corals or rocks, ever alert for passing prey. Hardy but extremely voracious. Do not keep with small, delicate tankmates.

Vertebrata; Actinopterygii; Perciformes; Cirrhitidae

Freckled Hawkfish ***Paracirrhites forsteri***

22 cm (8.6 in.) Indo-Pacific

■ **Feeding** Preys on small fishes and crustaceans in the wild. Accepts a variety of substitute meaty foods in the aquarium.

■ **Compatibility** Reef safe, but will eat any fish or crustacean small enough to swallow. Has a tendency to bully fishes; do not keep with docile species. Keep singly, unless a mated pair.

One of the larger hawkfishes, attractive and interesting but growing too large for most reef tanks. Hardy but extremely voracious.

Vertebrata; Actinopterygii; Perciformes; Cirrhitidae

Longnose Hawkfish ***Oxycirrhites typus***

10 cm (3.9 in.) Indo-Pacific

Feeding Preys on small fishes and crustaceans in the wild. Accepts many substitute foods.

Compatibility Reef safe. Will eat any fish or crustacean small enough to swallow. Harmless to corals and sessile invertebrates. Aggressive toward its own and related species. Keep singly, unless a mated pair.

A favorite of many aquarists, it may perch on corals awaiting passing food items. Hardy but predatory on smaller fishes.

Vertebrata; Actinopterygii; Perciformes; Opistognathidae

Yellowhead Jawfish ***Opistognathus aurifrons***

10 cm (3.9 in.) Caribbean

Aquascaping Requires a deep sand bed (10 cm [3.9 in.] or deeper) for burrowing, and pieces of mollusk shell for tunneling.

Feeding Carnivorous; accepts a variety of meaty foods.

Compatibility Reef safe. Somewhat sensitive and shy. Keep with peaceful fishes. May be kept singly or in groups.

A fascinating fish that is excellent for a reef aquarium. Often difficult to acclimate in community tanks. Has a tendency to jump out of the tank, particularly during the first few weeks.

Vertebrata; Actinopterygii; Perciformes; Opistognathidae

Bluespotted Jawfish ***Opistognathus rosenblatti***

10 cm (3.9 in.) Eastern Pacific

■ **Aquascaping** Must have a thick bed (10 cm [3.9 in.] or deeper) of mixed coral sand, and rubble or mollusk shells for its tunnel building.

■ **Feeding** Carnivorous; accepts a variety of meaty foods.

■ **Compatibility** Reef safe, but may eat small shrimps. Keep with peaceful fishes. Best kept singly or in mated pairs; intraspecific aggression can be a problem.

Excellent fish for a reef aquarium. Tends to jump out of the tank, particularly during the first few weeks. Provide good cover.

Vertebrata; Actinopterygii; Perciformes; Opistognathidae

Dusky Jawfish ***Opistognathus whitehurstii***

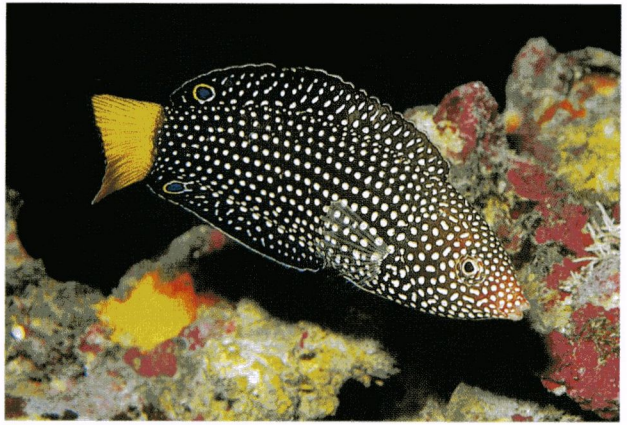
10 cm (3.9 in.) Caribbean

Aquascaping Must have a thick bed (10 cm [3.9 in.] or deeper) of mixed coral sand, and rubble or mollusk shells for its tunnel building.

Feeding Carnivorous; accepts a variety of meaty foods.

Compatibility Reef safe, but may eat small shrimps. May be kept in groups if adequate sandy bottom is available. Each fish will require an area with a radius of about 15 cm (5.9 in.)

Excellent fish for the reef aquarium. Has a tendency to jump out of the tank, particularly during the first few weeks. Provide good cover.



Vertebrata; Actinopterygii; Perciformes; Labridae

Yellowtail Wrasse ***Anampses meleagrides***

21 cm (8.2 in.) Indo-Pacific, Red Sea

Aquascaping Should have a large area of fine sand (4-5 cm [1.6-2 in.] or deeper) for digging. Needs well-established live rock to thrive.

Feeding Carnivorous. Very difficult to adapt to substitute meaty foods. Live food is often necessary to induce feeding.

Compatibility Reef safe. Several females may be kept together, but only one male per tank. Does best with peaceful tankmates.

Part of a challenging genus known as the tamarin wrasses that are difficult to adapt to aquarium life. For experienced aquarists only.

Vertebrata; Actinopterygii; Perciformes; Labridae

Redtail Tamarin Wrasse ***Anampses chrysocephalus***

17 cm (6.6 in.) Hawaii and Midway Islands

Aquascaping Should have a large area with fine sand (4-5 cm [1.6-2 in.] or deeper) for digging. Needs well-established live rock with a healthy population of microfauna to thrive.

Feeding Carnivorous. Very difficult to adapt to substitute meaty foods. Live food is often necessary to induce feeding.

Compatibility Reef safe. Several females may be kept together, but only one male per tank. Does best with peaceful tankmates.

A true beauty, but a fish that requires expert care and feeding.

Vertebrata; Actinopterygii; Perciformes; Labridae

Lyretail Hogfish ***Bodianus anthioides***

21 cm (8.2 in.) Indo-Pacific; Red Sea

Aquascaping Juveniles need good hiding places. Provide a large sand zone and ample swimming space.

Feeding Carnivorous; readily accepts a variety of meaty foods.

Compatibility Reef safe, but will eat most small, free-living invertebrates. Fairly peaceful for a hogfish, but may bully more sensitive and delicate fishes. Likely to eat fishes small enough to swallow.

A very beautiful and reasonably hardy species. Juveniles are shy, but adults become too aggressive for most community tanks.

Vertebrata; Actinopterygii; Perciformes; Labridae

Twinspot Hogfish ***Bodianus bimaculatus***

10 cm (3.9 in.) Indo-west Pacific

Feeding Carnivorous; readily accepts a variety of meaty foods.

Compatibility Reef safe, but will feed on most small, free-living invertebrates. Reasonably peaceful, but more sensitive and delicate fishes might be bullied. Several specimens may be kept together in large tanks if introduced simultaneously. In tanks less of than 500 liters (130 gal.) it is better kept singly.

This is a very nice wrasse for a reef aquarium, but it may be too competitive for small and sensitive fishes.

Vertebrata; Actinopterygii; Perciformes; Labridae

Spanish Hogfish ***Bodianus rufus***

40 cm (15.6 in.) Tropical Western Atlantic

Aquascaping Juveniles need good hiding places. Provide a large sand zone and open swimming space.

Feeding Carnivorous; readily accepts a variety of meaty foods.

Compatibility Reef safe, but will feed on most small, free-living invertebrates; but corals are generally left undisturbed. Aggressive toward more-docile species and predatory on small fishes.

Too large for the average home aquarium, but an interesting show fish for tanks of 1,000 liters (260 gal.) or more.

Vertebrata; Actinopterygii; Perciformes; Labridae

Coral Hogfish ***Bodianus mesothorax***

19 cm (7.4 in.) Western Pacific

Aquascaping Juveniles need good hiding places. Provide a large sand zone and open swimming space.

Feeding Carnivorous; readily accepts a variety of meaty foods.

Compatibility Reef safe, but will feed on most small, free-living invertebrates; corals are generally left undisturbed. Aggressive toward more-docile species and predatory on small fishes.

Very beautiful and a reasonably hardy species. Adults are too aggressive for most reef tanks. Better suited to a large community fish tank.

Vertebrata; Actinopterygii; Perciformes; Labridae

Redheaded Fairy Wrasse ***Cirrhilabrus solorensis***

13 cm (5.1 in.) Indo-Australian Archipelago

■ **Aquascaping** Needs many hiding places. Provide a large sand zone where it can bury itself at night and good swimming space.

■ **Feeding** Carnivorous; readily accepts a variety of meaty foods.

■ **Compatibility** Reef safe. Quite peaceful, and leaves all but the smallest invertebrates alone. Several females may be kept together, but only one male per tank.

An excellent reef aquarium species, extremely beautiful and compatible with virtually all corals and motile invertebrates.

Vertebrata; Actinopterygii; Perciformes; Labridae

Twinspot Coris ***Coris aygula***

70 cm (27 in.) Indo-Pacific

Aquascaping Needs stable decor that cannot be overturned by the fish and a large sand bed where it will bury itself completely when frightened and at night.

Feeding Carnivorous; readily accepts a variety of meaty foods.

Compatibility Corals will be ignored, but this species is too big and predatory for most reef aquariums.

A classic case of exotic juveniles (photo) turning into plain-looking adults that are simply unkeepable in the average home system.

Vertebrata; Actinopterygii; Perciformes; Labridae

Formosan Coris — ***Coris frerei***

60 cm (23 in.) — Western Indian Ocean

■ **Aquascaping** Needs stable decor that cannot be overturned by the fish and a large sand bed where it will bury itself completely when frightened and at night.

■ **Feeding** Carnivorous; readily accepts a variety of meaty foods.

■ **Compatibility** Corals will be ignored, but this species is too big and predatory for most reef aquariums. (*Adult male at left.*)

A stunning show fish for large fish tanks. (Previously known as *C. formosa*.) Too large and aggressive for most home aquariums.

Vertebrata; Actinopterygii; Perciformes; Labridae

Harlequin Tuskfish ***Choerodon fasciatus***

30 cm (11.7 in.) Western Pacific

Aquascaping Needs caves or other rocky hiding places.

Feeding Carnivorous; readily accepts a variety of meaty foods.

Compatibility Reef safe with corals. Likely to feed on most free-living invertebrates and fishes small enough to swallow. May be aggressive toward more docile fishes.

An exceptionally colorful wrasse—even its teeth are blue—and a hardy, interesting addition to a large fish tank with robust tankmates. Too large and predatory for most reef aquariums.

Vertebrata; Actinopterygii; Perciformes; Labridae

Bird Wrasse ***Gomphosus varius***

30 cm (11.7 in.) Indo-Pacific

Aquascaping Needs hiding places and open swimming space.

Feeding Carnivorous; readily accepts a variety of meaty foods.

Compatibility Reef safe, but will eat most small free-living invertebrates and may harass or attack small fishes. Several females may be kept together, but only one male per tank. (Males are green; females, brown.)

An active fish with a swooping swimming style. The male is very attractive and can easily be paired with a female. Quite easy to keep.

Vertebrata; Actinopterygii; Perciformes; Labridae

Dusky Wrasse ***Halichoeres marginatus***

17 cm (6.6 in.) Indo-west-Pacific

Aquascaping Should have a large area with fine-grained sand at least 5 cm thick. Will bury completely when frightened and at night.

Feeding In the wild, eats benthic invertebrates, but can be difficult to adapt to substitute meaty foods.

Compatibility Reef safe. Will eat most small free-living invertebrates. Can be aggressive toward smaller and more-docile fishes.

A species with subtle beauty that is sometimes introduced to prey on flatworms that can occur in plague-like proportions in an aquarium.

Vertebrata; Actinopterygii; Perciformes; Labridae

Cleaner Wrasse ***Labroides dimidiatus***

10 cm (3.9 in.) Indo-Pacific

■ **Feeding** Nearly impossible to feed. A specialized feeder that lives as a cleaner of other fishes, it Ingests parasites, as well as mucus, scales, and fin fragments from the host fish. May accept finely minced meaty foods, brine shrimp, and worms.

■ **Conservation** Very low survival rates. Collection and sale of cleaner wrasses should not be encouraged.

Very difficult to adapt to aquarium life. Should be reserved for experienced aquarists able to provide advanced husbandry techniques.

Vertebrata; Actinopterygii; Perciformes; Labridae

Hawaiian Cleaner Wrasse *Labroides phthirophagus*

12 cm (4.7 in.) Hawaii

■ **Feeding** Nearly impossible to feed. A specialized feeder that lives as a cleaner of other fishes, it Ingests parasites, as well as mucus, scales, and fin fragments from the host fish. May accept finely minced meaty foods, brine shrimp, and worms.

■ **Conservation** Very low survival rates. Collection and sale of cleaner wrasses should not be encouraged.

This lovely species is nearly impossible to keep and is avoided by all responsible aquarists.

Vertebrata; Actinopterygii; Perciformes; Labridae

Leopard Wrasse ***Macropharyngodon meleagris***

15 cm (5.9 in.) Indo-west-Pacific

Aquascaping Must be housed with well-established live rock that will provide important living food organisms.

Feeding Will starve in a new or sterile aquarium. Live adult brine shrimp can be a supplementary food source.

Compatibility Reef safe.

Under prolific conditions, in a large tank with plenty of live rock providing varied microfauna for its constant foraging, this species can live happily. Members of this genus all require experienced care.

Vertebrata; Actinopterygii; Perciformes; Labridae

Sixline Wrasse ***Pseudocheilinus hexataenia***

7.5 cm (2.9 in.) Indo-Pacific, Red Sea

- **Aquascaping** Secretive species that needs many hiding places.
- **Feeding** Grazes on small benthic invertebrates. Accepts various meaty foods.
- **Compatibility** Reef safe. Quite peaceful, but may eat very small shrimps (e.g., *Periclimenes* spp.). Several specimens may be kept in large tanks (300 liters [78 gal.] or larger).

This is a very hardy, peaceful, and beautiful species for reef aquariums. Can help eliminate excessive populations of flatworms and snails.

Vertebrata; Actinopterygii; Perciformes; Labridae

Moon Wrasse ***Thalassoma lunare***

25 cm (9.8 in.) Indo-Pacific, Red Sea

- **Aquascaping** Requires open swimming space as it grows.
- **Feeding** Carnivorous; will accept most meaty foods.
- **Compatibility** Reef safe with corals, but small fishes and free-moving invertebrates are likely to be eaten. Several females may be kept together, but allow only one male per tank.

A vibrantly colored, active fish that is hardy and suitable for large tanks with robust tankmates. Juveniles are rather plain looking, assuming ever more beautiful coloration as they mature.

Vertebrata; Actinopterygii; Perciformes; Labridae

Bluehead Wrasse ***Thalassoma bifasciatum***

18 cm (7 in.) Caribbean, Tropical Western Atlantic

- **Aquascaping** Needs hiding places and open swimming space.
- **Feeding** Carnivorous; will accept most meaty foods.
- **Compatibility** Reef safe, but will eat small invertebrates, including serpent stars. Can be aggressive toward smaller, more docile fishes. can be kept in groups of one male and several females.

A Caribbean beauty with electric colors, but a potential threat to most other invertebrates in a reef tank. Fairly easy to keep.

Vertebrata; Actinopterygii; Perciformes; Scaridae

Bicolor Parrotfish ***Cetoscarus bicolor***

80 cm (31 in.) Indo-Pacific, Red Sea

Feeding Primarily herbivorous, scraping algae from the substrate with its beaklike mouth. Accepts a variety of substitute foods, but needs substantial quantities of algae to thrive.

Compatibility Likely to bite chunks of stony corals, otherwise safe with most fishes and invertebrates, including soft corals. Aggressive toward its own species and related fishes.

Far too big for all but very large home aquariums. Adult color phases are completely unlike the juvenile shown, but also attractive.

Vertebrata; Actinopterygii; Perciformes; Pinguipedidae

Redspotted Sand Perch ***Parapercis schauinslandi***

14 cm (5.5 in.) Indo-Pacific

- **Aquascaping** A large sand zone is obligatory for this family.
- **Feeding** Carnivorous; accepts a variety of meaty foods.
- **Compatibility** Reef safe, but crustaceans and fishes small enough to swallow are likely to be eaten. May become aggressive toward other fishes as it ages.

This is an attractive and hardy fish that makes an excellent bottom-dweller for reef tanks. Beware that small free-living invertebrates and some fishes are potential prey.

Vertebrata; Actinopterygii; Perciformes; Pholidichthyidae

Convict Blenny ***Pholidichthys leucotaenia***

35 cm (13.7 in.) Indo-west-Pacific

Aquascaping Needs caves and crevices for hiding and deep sand for burrowing. May topple rocks if they are not firmly situated.

Feeding Omnivore; readily accepts most foods.

Compatibility Reef safe, but do not combine with fishes, crustaceans, or invertebrates small enough to be swallowed whole.

This hardy but very secretive species constantly digs and may bury corals in sand. Its coloring changes to an attractive vertical stripe pattern as it ages (photo is a juvenile). Has spawned in captivity.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Bicolor Blenny ***Ecsenius bicolor***

10 cm (3.9 in.) Indo-Pacific

■ **Aquascaping** Needs established live rock for algal grazing.

■ **Feeding** Herbivore that scrapes microalgae from hard substrate. Accepts substitute foods, but is difficult to keep without algae.

■ **Compatibility** Usually reef safe and generally peaceful, but may occasionally eat corals and bite clams and other invertebrates. May be aggressive toward conspecifics and related species.

This is an interesting and generally commendable species for reef tanks. Some specimens may develop troublesome habits.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Red Sea Mimic Blenny ***Ecsenius gravieri***

8 cm (3.1 in.) Red Sea, Gulf of Aden

Aquascaping Needs established live rock for algal grazing.

Feeding Herbivore that scrapes microalgae from hard substrate. Accepts substitute foods, but is difficult to keep without algae.

Compatibility Usually reef safe and generally peaceful, but may eat corals and bite clams and other invertebrates. May be aggressive toward conspecifics and related species.

Mimics the venomous Blackline Fang Blenny, *Meiacanthus nigrolineatus*. Good reef species, but with occasional problem specimens.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Midas Blenny ***Ecsenius midas***

13 cm (5.1 in.) Indo-Pacific, Red Sea

Feeding Carnivorous; eats zooplankton and substitutes such as *Mysis* and brine shrimp. Feed several times daily. A varied, vitamin-enriched diet is necessary for good health and vivid color.

Compatibility Reef safe. Generally peaceful, but may become aggressive toward similar-looking fish species.

An excellent reef aquarium species, and the only planktivore in its genus. Will often swarm together in mixed schools with *Pseudanthias* spp.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Highfin Blenny ***Atrosalarias fuscus***

14.5 cm (5.7 in.) Western Pacific

Aquascaping Needs established live rock for algal grazing.

Feeding Herbivore that scrapes microalgae from hard substrate. Accepts substitute foods, but is very difficult to keep without good algae-foraging opportunities in the aquarium.

Compatibility Reef safe and peaceful, although some specimens may nip at stony corals.

This is a good reef aquarium species with several color variations, from blackish brown to yellow.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Leopard Blenny ***Exallias brevis***

14.5 cm (5.7 in.) Indo-Pacific

- **Feeding** Feeds almost exclusively on the polyps of small-polyped stony corals. Hardly possible to keep alive on substitute foods.
- **Compatibility** Not reef safe. Will eat most stony corals.
- **Conservation** The majority of imported specimens starve to death shortly after importation because of a lack of suitable foods.

This is a beautiful fish, but one most aquarists must shun. Don't buy it unless you have the skill, time, and resources to invest in experimental husbandry techniques.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Redlip Blenny ***Ophioblennius atlanticus***

12 cm (4.7 in.) Tropical Western Atlantic

- **Aquascaping** Needs established live rock for algal grazing.
- **Feeding** Herbivore that scrapes microalgae from hard substrate. Accepts substitute foods, but is very difficult to keep without good algae-foraging opportunities in the aquarium.
- **Compatibility** Reef safe. Some specimens may nip at stony corals and clams. May be aggressive toward conspecifics.

An appealing Caribbean species and an excellent algae eater for reef aquariums. Hardy and fairly peaceful.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Jeweled Blenny ***Salarias fasciatus***

13 cm (5.1 in.) Widespread in the Indo-Pacific

■ **Aquascaping** Needs established live rock for algal grazing.

■ **Feeding** Herbivore that scrapes microalgae from hard substrate. Accepts substitute foods, but is very difficult to keep without good algae-foraging opportunities in the aquarium.

■ **Compatibility** Usually reef safe. May be aggressive toward conspecifics and more-timid fishes, especially other small herbivores.

Among the very best algae grazers for reef tanks. Extremely efficient, but will usually starve when all the algae has been eaten.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Bluestriped Fang Blenny ***Plagiotremus rhinorhynchos***

12 cm (4.7 in.) Indo-Pacific

■ **Feeding** Feeds on the scales and body mucus of other fishes. Difficult to adapt to substitute foods.

■ **Compatibility** Aggressive predator that will harm other fishes. Has also been reported to attack invertebrates.

Part of a noteworthy group known as the fang blennies or sabretooth blennies that are not appropriate for most home aquariums. To be kept properly, they require an experienced aquarist and a specially dedicated system.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Cleaner Mimic ***Aspidontus taeniatus***

11.5 cm (4.5 in.) Indo-Pacific, Red Sea

■ **Feeding** Carnivorous; feeds on the scales and body mucus of other fishes, as well as fish eggs and polychaete worm tentacles. Difficult to adapt to substitute foods.

■ **Compatibility** Generally reef safe, but will aggressively prey upon other fishes in the aquarium.

This species mimics the Cleaner Wrasse, *Labroides dimidiatus*, allowing it to sneak up on unsuspecting victims. Not recommended to most aquarists, but it could be kept in a specialized predator display.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Blackline Fang Blenny ***Meiacanthus nigrolineatus***

9.5 cm (3.7 in.) Red Sea, Gulf of Aden

■ **Feeding** Carnivorous planktivore; accepts a variety of meaty foods.

■ **Compatibility** Generally peaceful, but may bite other fishes (or the aquarist) if provoked.

■ **Hazards** Has a mildly venomous bite that may cause swelling and irritation in humans.

The venomous bite of this species is believed to be a means of defense against predators. It is a good fish for the reef aquarium, but not among the easiest to keep.

Vertebrata; Actinopterygii; Perciformes; Blenniidae

Striped Fang Blenny ***Meiacanthus grammistes***

12 cm (4.7 in.) Indo-west Pacific

Feeding Carnivorous planktivore; accepts a variety of meaty foods.

Compatibility Generally peaceful, but may bite other fishes (or the aquarist) if provoked.

Hazards Has a mildly venomous bite that may cause swelling and irritation in humans.

This is a good and hardy fish for the reef aquarium. Aquarists who are sensitive to animal stings should note that it has a mildly venomous bite and may nip humans if provoked.

Vertebrata; Actinopterygii; Perciformes; Callionymidae

Spotted Mandarinfish ***Synchiropus picturatus***

7 cm (2.7 in.) Indo-west Pacific

- **Aquascaping** Must be housed with plenty of live rock to supply a varied, rich supply of tiny, live food organisms.
- **Feeding** Carnivorous; feeds on minute benthic organisms. May accept brine shrimp, mysid shrimp, and other meaty foods.
- **Compatibility** Reef safe. Needs a peaceful, noncompetitive aquarium. Do not keep with active or aggressive fishes or large crustaceans. Keep only one male per tank.

A wonderful fish for the established reef tank with rich microfauna.

Vertebrata; Actinopterygii; Perciformes; Callionymidae

Green Mandarinfish ***Synchiropus splendidus***

10 cm (3.9 in.) Indo-west Pacific

- **Aquascaping** Must be housed with plenty of live rock to supply a varied, rich supply of tiny, live food organisms.
- **Feeding** Carnivorous; feeds on minute benthic organisms. May accept brine shrimp, mysid shrimp, and other meaty foods.
- **Compatibility** Reef safe. Needs a peaceful, noncompetitive aquarium. Do not keep with aggressive fishes or large crustaceans. Keep only one male (with elongated first dorsal spine) per tank.

A true beauty for a quiet, established reef aquarium.

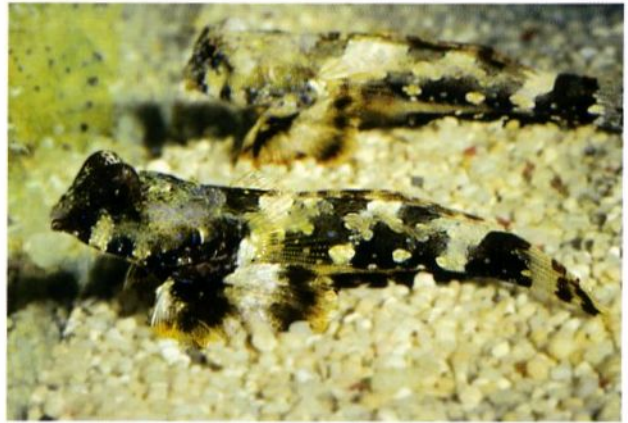
Vertebrata; Actinopterygii; Perciformes; Callionymidae

Scooter Dragonet ***Synchiropus ocellatus***

6 cm (2.3 in.) Western Pacific

- **Aquascaping** Must be housed with plenty of live rock to supply a varied, rich supply of tiny, live food organisms.
- **Feeding** Carnivorous; feeds on minute benthic organisms. May accept brine shrimp, mysid shrimp, and other meaty foods.
- **Compatibility** Reef safe. Needs a peaceful, noncompetitive aquarium. Do not keep with active or aggressive fishes or large crustaceans. Keep only one male per tank.

An interesting little fish for a quiet reef tank with rich microfauna.



Vertebrata; Actinopterygii; Perciformes; Gobiidae

Orangespotted Shrimp Goby ***Amblyeleotris guttata***

8 cm (3.1 in.) Indo-west Pacific

- **Aquascaping** Provide a large area of sand flat, at least 5 cm (2 in.) thick, consisting of fine sand and coral rubble.
- **Feeding** Carnivorous; accepts a variety of meaty foods.
- **Compatibility** Reef safe, but may eat tiny shrimps.

This is one a of group of specialized gobies that live in burrows with pistol shrimps (*Alpheus* spp.). When paired with a commensal shrimp, these gobies are fascinating aquarium specimens, especially in sand-zone biotopes. Good choice for a biotope tank.

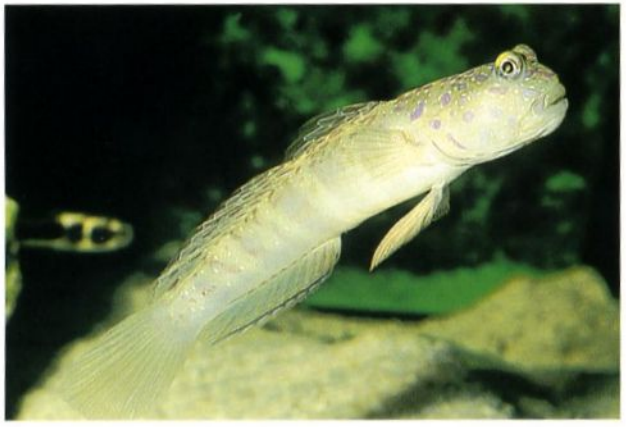
Vertebrata; Actinopterygii; Perciformes; Gobiidae

Spottail Shrimp Goby ***Amblyeleotris latifasciata***

13 cm (5.1 in.) Indo-Pacific

- **Aquascaping** Provide a large area of sand flat, at least 8 cm (3.1 in.) thick, consisting of fine sand and coral rubble.
- **Feeding** Carnivorous; accepts a variety of meaty foods.
- **Compatibility** Reef safe, but may eat tiny shrimps.

This is another commensal goby that lives in a burrow with a pistol shrimp (*Alpheus* spp.). When paired with a lifelong partner shrimp, these gobies are fascinating aquarium specimens, especially in sand-zone biotopes. Good choice for a biotope tank.



Vertebrata; Actinopterygii; Perciformes; Gobiidae

Pinkspotted Shrimp Goby ***Cryptocentrus leptocephalus***

10 cm (3.9 in.) Indo-Pacific

Aquascaping Provide a large area of sand flat, at least 8 cm (3.1 in.) thick, consisting of fine sand and coral rubble.

Feeding Carnivorous; accepts a variety of meaty foods.

Compatibility Reef safe. Extremely aggressive toward other bottom-dwelling fishes. Likely to eat small shrimps.

A very attractive shrimp goby but large enough to be a threat to others that compete with it for space and food. It is an excellent species for a reef tank, particularly a sand-zone aquarium.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Yellow Watchman Goby ***Cryptocentrus cinctus***

7 cm (2.7 in.) Indo-west Pacific

Aquascaping Provide a large area of sand flat, at least 5 cm (2 in.) thick, consisting of fine sand and coral rubble.

Feeding Carnivorous; accepts a variety of meaty foods.

Compatibility Likely to eat small shrimps, and may attack other shrimp goby species. Otherwise peaceful and harmless. Best kept singly or in mated pairs.

A beautiful, common species that is seen in two very distinct color morphs: uniformly bright yellow, or gray.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Blackray Shrimp Goby ***Stonogobiops nematodes***

4 cm (1.6 in.) Indonesia and the Philippines

■ **Aquascaping** Provide a large area of sand flat, at least 3 cm (1.2 in.) thick, consisting of fine sand and coral rubble.

■ **Feeding** Carnivorous; accepts a variety of meaty foods.

■ **Compatibility** Reef safe. Needs a peaceful community tank, otherwise very shy. May be aggressive toward other bottom-dwelling fishes. Best kept in pairs. Two males will always fight.

Lives in burrows with a pistol shrimp, usually *Alpheus randalli*. Excellent species for reef tanks, particularly, sand-zone aquariums.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Brownbarred Goby ***Amblygobius phalaena***

15 cm (5.9 in.) Indo-Pacific

- **Aquascaping** Provide a large area of sand flat consisting of fine sand and coral rubble.
- **Feeding** Digs in the sand for benthic invertebrates and detritus. Also grazes on algae. Accepts a variety of substitute foods.
- **Compatibility** Reef safe. Prone to being harassed by active and aggressive fishes. Best kept singly or in mated pairs.

Does not associate with shrimps, as others in its genus, but a great fish for a sand-zone reef aquarium. Will keep bottom substrate loose.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Rainford's Goby ***Amblygobius rainfordi***

6.5 cm (2.5 in.) Western and Central Pacific

Aquascaping Provide plenty of live rock and sand for grazing.

Feeding Omnivorous; eat filamentous algae and will dig in the sand for benthic invertebrates and detritus. Accepts a variety of substitute meaty foods, but needs some algae in order to do well.

Compatibility Reef safe. Prone to being harassed by aggressive fishes. Keep singly, except in a large system.

Excellent reef aquarium fish; peaceful and colorful. Often starves in newly set up tanks without rich and diverse microfauna and -flora.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Signal Goby ***Signigobius biocellatus***

7 cm (2.7 in.) Western Pacific

Aquascaping Requires well-established live rock and a deep sand bed to provide live microfauna that serve as food for the fish.

Feeding Hunts for benthic invertebrates in the sand. Difficult to adapt to substitute foods.

Compatibility Reef safe, but may eat shrimps and worms. Best kept in pairs, as it occurs in nature.

A lovely species with two ocelli (false eyespots), but prone to starving in the aquarium. Best reserved for experienced aquarists.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Yellowheaded Sleeper Goby ***Valenciennea strigata***

18 cm (7 in.) Indo-Pacific

- **Aquascaping** Requires well-established live rock and a deep sand bed to provide live microfauna that serve as food for the fish.
- **Feeding** Digs for benthic invertebrates in the sand. Difficult to provide with sufficient food. Accepts a variety of substitute foods, but can starve unless live food is available.
- **Compatibility** Reef safe. May eat shrimps and small fishes.

A wonderful fish for a sand-zone reef aquarium, but a challenge to feed properly. Not a good choice for inexperienced aquarists.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Orangespotted Sleeper Goby ***Valenciennea puellaris***

14 cm (5.5 in.) Indo-west-Pacific

Aquascaping Requires well-established live rock and a deep sand bed to provide live microfauna that serve as food for the fish.

Feeding Digs for benthic invertebrates in the sand. Difficult to provide with sufficient food. Accepts a variety of substitute foods, but can starve unless live food is available.

Compatibility Reef safe. May eat shrimps and small fishes.

A beautiful fish for a well-established sand-zone reef aquarium, but prone to starving in most other systems. For experienced keepers only.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Ornate Goby ***Istigobius ornatus***

10 cm (3.9 in.) Indo-Pacific, Red Sea

■ **Aquascaping** Should have caves and rocky hiding places close to a sandy substrate.

■ **Feeding** Carnivorous; readily accepts a variety of meaty foods.

■ **Compatibility** Reef safe, but shy and not capable of competing for food with larger or more aggressive fishes. May eat worms and small shrimps. Peaceful toward most fishes, except its own species and close relatives.

A fascinating and hardy fish for a reef tank. (*Female shown.*)

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Neon Goby ***Gobiosoma oceanops***

3.5 cm (1.4 in.) Tropical Western Atlantic

- **Aquascaping** Does best in a tank with live rock and live sand.
- **Feeding** Serves as a cleaner of other fishes, eating parasites and probably mucus from the host fish. Accepts various meaty foods (shrimp meat, brine shrimp, worms) of an appropriate size.
- **Compatibility** Reef safe and peaceful, but can fall prey to predators. Can be aggressive with its own kind, particularly in small tanks.

A wonderful little fish for peaceful coral reef tanks. Will function as a cleaner fish in an aquarium and even clean the aquarist's hands.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Citron Clown Goby ***Gobiodon citrinus***

7 cm (2.7 in.) Indo-Pacific, Red Sea

Aquascaping Does best with live *Acropora* coral, its natural host.

Feeding Carnivorous; accepts a variety of meaty foods.

Compatibility Reef safe. Likely to nip *Acropora* polyps in conjunction with spawning preparations, but causes little damage. Best kept in quiet communities, with groups of several specimens.

A marvelous fish when combined with *Acropora* coral. Fascinating spawning behavior can be observed in captivity. Hardy, peaceful, and decorative fish species.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Yellow Clown Goby ***Gobiodon okinawae***

3.5 cm (1.4 in.) Indo-Pacific

Aquascaping Does best with live *Acropora* coral, its natural host.

Feeding Carnivorous; accepts a variety of meaty foods.

Compatibility Reef safe. Best kept in groups of several specimens. Among branching coral colonies, pairs will form and disperse among the corals. Avoid housing with large, aggressive fishes.

Like other members of its genus, an excellent fish for combination with *Acropora* corals. Fascinating spawning behavior can be observed in the aquarium. Hardy, peaceful, and attractive.

Vertebrata; Actinopterygii; Perciformes; Gobiidae

Green Clown Goby ***Gobiodon rivulatus***

3.5 cm (1.4 in.) Western Pacific

Aquascaping Does best with live *Acropora* coral, its natural host.

Feeding Carnivorous; accepts a variety of meaty foods.

Compatibility Reef safe. Best kept in groups of several specimens. Among branching coral colonies, pairs will form and disperse among the corals. Avoid housing with large, aggressive fishes.

A small beauty and a perfect fish for combination with *Acropora* corals. Fascinating spawning behavior can be observed in the aquarium. Hardy, peaceful, and attractive.

Vertebrata; Actinopterygii; Perciformes; Microdesmidae

Purple Firefish ***Nemateleotris decora***

8 cm (3.1 in.) Indo-Pacific

Aquascaping Needs rocky crevices or coral rubble for hiding.

Feeding Carnivorous. Accepts a variety of plankton substitutes, such as mysid shrimp and brine shrimp, preferably vitamin-enriched, that it will pluck out of the water column.

Compatibility Reef safe. Peaceful and harmless species. Avoid keeping with large and competitive species.Rather aggressive toward conspecifics. Best kept singly or in mated pairs.

An eyecatching fish for the reef aquarium. Hardy, if properly fed.

Vertebrata; Actinopterygii; Perciformes; Microdesmidae

Firefish ***Nemateleotris magnifica***

8 cm (3.1 in.) Indo-Pacific

Aquascaping Needs rocky crevices or coral rubble for hiding.

Feeding Carnivorous. Accepts a variety of plankton substitutes, such as mysid shrimp and brine shrimp, preferably vitamin-enriched, that it will pluck out of the water column.

Compatibility Reef safe. Peaceful and harmless species. Avoid keeping with large and competitive species. Rather aggressive toward conspecifics. Best kept singly or in mated pairs.

A beautiful fish for quiet reef tanks. Hardy, if provided suitable foods.

Vertebrata; Actinopterygii; Perciformes; Microdesmidae

Scissortail Dartfish ***Ptereleotris evides***

12 cm (4.7 in.) Indo-Pacific

- **Aquascaping** Needs rocky crevices or coral rubble for hiding.
- **Feeding** Carnivorous. Accepts a variety of plankton substitutes.
- **Compatibility** Reef safe. A peaceful and harmless species. Avoid combination with large and aggressive species. Juveniles do well in large groups, but adults tend to live in pairs.

An excellent fish for the reef aquarium. Less prone to hide than most other dartfishes. Tends to try to escape by fleeing; will jump from uncovered aquariums, so tank must have a good cover.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Achilles Surgeonfish ***Acanthurus achilles***

24 cm (9.4 in.) Central Pacific

Aquascaping Should have plenty of swimming space.

Feeding Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

Compatibility Generally reef safe. Very aggressive toward its own kind and other surgeonfishes. Best kept singly. Prone to parasites.

One of the more delicate and hard-to-keep surgeonfishes. Best reserved for experienced aquarists. Needs a lot of space—a minimum system size of 500 liters (130 gal.) or larger.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Atlantic Blue Tang ***Acanthurus coeruleus***

35 cm (13.7 in.) Tropical Western Atlantic

■ **Aquascaping** Should have plenty of swimming space.

■ **Feeding** Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

■ **Compatibility** Generally reef safe. May be kept in groups in tanks 1,000 liters (260 gal.) or larger, otherwise best kept singly or in mated pairs.

Among the more hardy *Acanthurus* spp.—excellent for large Caribbean reef tanks. Juveniles are bright yellow, adults are blue.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Powder Blue Surgeonfish ***Acanthurus leucosternon***

30 cm (11.7 in.) Indian Ocean

Aquascaping Should have plenty of swimming space.

Feeding Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

Compatibility Generally reef safe. Normally does well with unsimilar looking species, but is very aggressive toward other surgeonfishes. Should be kept singly, except in large systems.

Extremely beautiful and sought after, but a delicate and hard-to-keep surgeonfish. Very susceptible to white-spot disease (marine ich).

Powder Blue Surgeonfish (*Acanthurus leucosternon*) in the Indian Ocean normally forage singly or in pairs, but sometimes form large feeding swarms to graze in the safety of a pack. Without such herbivorous fishes, wild reefs become overgrown with algae.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Orangeshoulder Surgeonfish ***Acanthurus olivaceus***

35 cm (13.7 in.) Indo-Pacific

Aquascaping Should have plenty of swimming space.

Feeding Herbivorous. Feeds on diatoms, detritus, and filamentous microalgae. Accepts a variety of substitute foods.

Compatibility Reef safe. Generally peaceful toward fishes, even other surgeonfishes. Small groups may be kept together in large tanks. May be attacked by more aggressive surgeonfishes.

One of the best surgeonfishes for a reef tank. Fairly hardy and less aggressive than others in its family. Juveniles are yellow.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Mimic Surgeonfish ***Acanthurus pyroferus***

25 cm (9.8 in.) Indo-west-Pacific

Aquascaping Should have plenty of swimming space.

Feeding Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

Compatibility Generally reef safe. Best kept singly. Varying aggression toward fishes; normally does well with unsimilar species.

Fairly hardy; suitable for reef tanks 300 liters (78 gal.) or larger. Juveniles are colorful mimics of some pygmy angelfishes (*Centropyge vroliki* and *C. flavissimus*), but adults (photo) are brownish.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Clown Surgeonfish ***Acanthurus lineatus***

38 cm (14.8 in.) Indo-Pacific

Aquascaping Should have plenty of swimming space.

Feeding Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

Compatibility Generally reef safe. Extremely aggressive toward its own species and any other fishes with behavioral or morphological resemblances. Will often harass target fishes until they are killed.

Rather difficult to keep and very belligerent. Best reserved for experienced aquarists. Needs a large tank of at least 1,000 liters (260 gal.).

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Hawaiian Bristletooth ***Ctenochaetus hawaiiensis***

25 cm (9.8 in.) Central Pacific

- **Aquascaping** Needs well-established live rock to provide natural grazing surfaces. Needs plenty of open swimming space.
- **Feeding** Herbivorous. Scrapes detritus, diatoms, and other unicellular algae off macroalgae, coral bases, and rocks. Needs a variety of dried algae and algae-based foods.
- **Compatibility** Reef safe. Aggressive toward conspecifics.

A fairly hardy fish suitable for a larger reef aquarium. Juveniles are very colorful and prized by aquarists, but adults are dull brownish overall.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Striped Bristletooth ***Ctenochaetus striatus***

22 cm (8.6 in.) Indo-Pacific

Aquascaping Needs well-established live rock to provide natural grazing surfaces. Needs plenty of open swimming space.

Feeding Herbivorous. Scrapes detritus, diatoms, and other unicellular algae off macroalgae, coral bases, and rocks. Needs a variety of dried algae and algae-based foods.

Compatibility Reef safe. Peaceful toward unsimilar fishes.

A reasonably hardy, if unspectacular, surgeonfish, suitable for a 350-liter (90 gal.) or larger reef tank.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Palette Surgeonfish ***Paracanthurus hepatus***

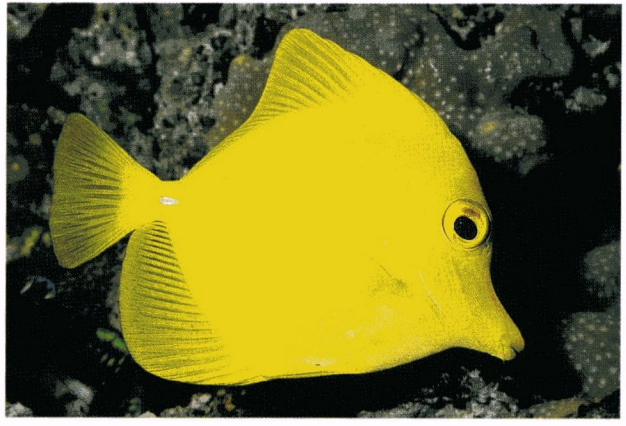
30 cm (11.7 in.) Indo-Pacific

Aquascaping Juveniles are shy and require plenty of hiding places, such as branching corals. Needs open swimming space.

Feeding Omnivorous; feeds mostly on zooplankton, but also algae. Needs a balanced, nutritious diet to avoid deficiency diseases.

Compatibility Reef safe. Juveniles do best in groups. Adults can be aggressive toward each other, except in very large systems.

This is an atypical surgeonfish, because of its zooplankton needs. Susceptible to ich and nutritional deficiencies. Not a beginner's fish.



Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Yellow Tang ***Zebrasoma flavescens***

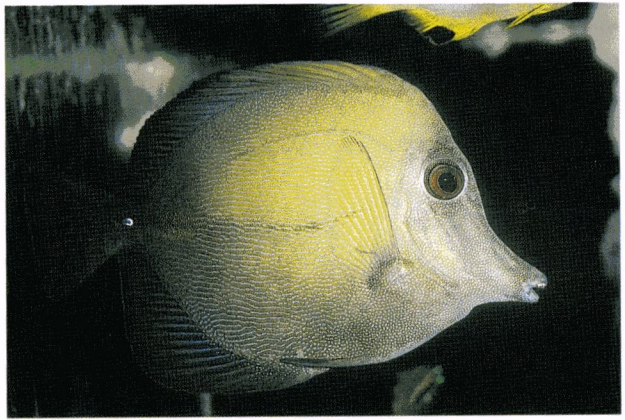
18 cm (7 in.) Central Pacific

■ **Aquascaping** Needs room to swim; 250 liters (65 gal.) or more.

■ **Feeding** Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

■ **Compatibility** Reef safe. Often aggressive toward fishes it perceives as competitive. Keep singly, except in large tanks.

One of the best and most popular surgeonfishes. Excellent algae grazer for medium- and large-sized tanks. Very hardy, but too aggressive for small aquariums.



Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Brown Tang ***Zebrasoma scopas***

20 cm (7.8 in.) Indo-Pacific

- **Aquascaping** Needs room to swim; 250 liters (65 gal.) or more.
- **Feeding** Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.
- **Compatibility** Reef safe. Often aggressive toward fishes it perceives as competitive. Keep singly, except in large tanks, where groups should be introduced simultaneously.

This is a fish with subdued coloration, but a good algae grazer for medium- and large-sized tanks.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Sailfin Tang ***Zebrasoma veliferum***

40 cm (15.6 in.) Indo-west Pacific

Aquascaping Should have plenty of swimming space.

Feeding Mostly herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

Compatibility Reef safe. Often very aggressive toward fishes with behavioral or morphological resemblances. Best kept singly, except in very large tanks of 3,000 liters (780 gal.) or larger.

An elegant, hardy, and efficient algae grazer. Due to its large adult size, it may outgrow tanks less than 1,000 liters (260 gal.). See *Z. desjardinii*.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Indian Ocean Sailfin Tang ***Zebrasoma desjardinii***

40 cm (15.6 in.) Red Sea, Indian Ocean

■ **Aquascaping** Should have plenty of swimming space.

■ **Feeding** Herbivorous. Needs live and dried algae, algae-based food mixtures, leaf lettuce, zucchini, and/or broccoli.

■ **Compatibility** Reef safe. Often very aggressive toward fishes with behavioral or morphological resemblances. Best kept singly, except in very large tanks of 3,000 liters (780 gal.) or larger.

A very hardy and appealing algae grazer. It may outgrow tanks of less than 1,000 liters (260 gal.). Very similar to *Z. veliferum*.

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Purple Tang ***Zebrasoma xanthurum***

25 cm (9.8 in.) Red Sea, Arabian Gulf

Aquascaping Should have plenty of swimming space.

Feeding Herbivorous. A varied, nutritious diet, rich in live and dried algae, is necessary to maintain health and coloration.

Compatibility Reef safe. Often very aggressive toward fishes it perceives as competitors. Best kept singly, except in very large tanks of 3,000 liters (780 gal.) or larger.

Prized for its color and algae grazing, this is a reef aquarium favorite for medium- and large-sized tanks (350 liters [90 gal.] or more).

Vertebrata; Actinopterygii; Perciformes; Acanthuridae

Orangespine Unicornfish ***Naso lituratus***

45 cm (17.6 in.) Indo-Pacific

Aquascaping Needs ample swimming space (1,000 liters [260 gal.] or more).

Feeding Must have brown macroalgae, like *Sargassum* and *Dictyota*. Provide similar algae (fresh, frozen, or dried) to thrive. Soaked nori (dried sushi seaweed) is a good alternative.

Compatibility Reef safe. Aggressive toward conspecifics and related species. Keep singly.

This is a great reef aquarium fish, colorful and active, for large tanks.

Vertebrata; Actinopterygii; Perciformes; Siganidae

Virgate Rabbitfish ***Siganus virgatus***

30 cm (11.7 in.) Indo-Pacific

Feeding Mostly herbivorous. Accepts a variety of substitute foods in the aquarium, but live and dried or frozen algae is essential.

Compatibility Reef safe and fairly peaceful toward most fishes. Aggressive toward conspecifics and closely related species. Best kept singly.

Hazards All rabbitfishes have venomous fin spines. Stings can be painful—sometimes with serious side effects. Handle with care.

Very hardy and a constant algae grazer for the reef aquarium.

Vertebrata; Actinopterygii; Perciformes; Siganidae

Magnificent Rabbitfish ***Lo magnificus***

23 cm (9 in.) Thailand

■ **Feeding** Mostly herbivorous. Accepts a variety of substitute foods in the aquarium, but live and dried or frozen algae is essential.

■ **Compatibility** Reef safe and fairly peaceful toward most fishes. Aggressive toward conspecifics and closely related species.

■ **Hazards** All rabbitfishes have venomous fin spines. Stings can be painful—sometimes with serious side effects. Handle with care.

A beautiful and durable algae grazer for reef aquariums. (Some authors lump the genus *Lo* with *Siganus*.)

Vertebrata; Actinopterygii; Perciformes; Siganidae

Foxface Rabbitfish ***Lo vulpinus***

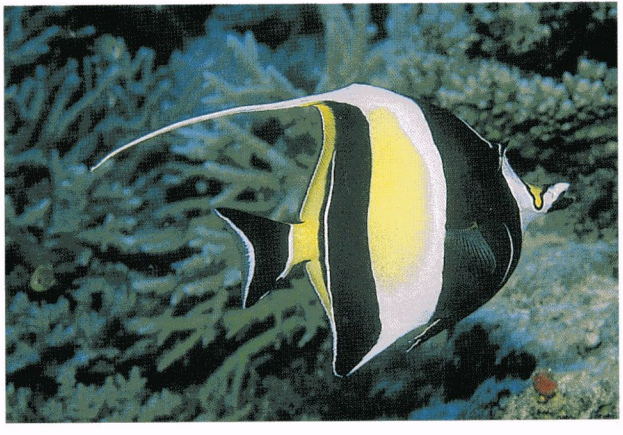
25 cm (9.8 in.) Western Pacific

■ **Feeding** Mostly herbivorous. Accepts a variety of substitute foods in the aquarium, but live and dried or frozen algae is essential.

■ **Compatibility** Reef safe and fairly peaceful toward most fishes. Aggressive toward conspecifics and closely related species.

■ **Hazards** All rabbitfishes have venomous fin spines. Stings can be painful—sometimes with serious side effects. Handle with care.

A great beginner's fish—colorful, hardy, and an active algae grazer that makes a good community member.



Vertebrata; Actinopterygii; Perciformes; Zanclidae

Moorish Idol ***Zanclus cornutus***

22 cm (8.9 in.) Indo-Pacific

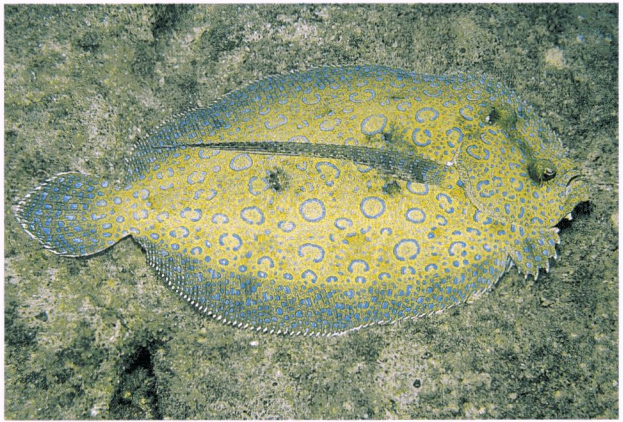
Aquascaping Well-established live rock is essential to supply some of the desired live food organisms this species grazes upon.

Feeding Most specimens are very reluctant to feed in captivity. Its natural diet may include sponges, bryozoans, hydroids, polychaete worms, and algae—at least for some populations.

Compatibility May nip at corals and other sessile invertebrates.

Conservation The vast majority of imported specimens starve.

A marine icon, but extremely difficult to keep in most cases. For experienced aquarists only.



Vertebrata; Actinopterygii; Pleuronectiformes; Bothidae

Peacock Flounder ***Bothus lunatus***

46 cm (17.9 in) Caribbean

Aquascaping Requires ample areas of open sandy bottom.

Feeding Carnivorous. Offer a variety of meaty foods.

Compatibility Reef safe with corals, but a threat to fishes and crustaceans small enough for it to attack and swallow.

Flounders are ambush predators and not the easiest fishes to keep in a typical reef aquarium. A large, sand-bottom biotope would be an appropriate setting. *B. mancus* is the Indo-Pacific Peacock Flounder.

Vertebrata; Actinopterygii; Tetraodontiformes; Balistidae

Clown Triggerfish ***Balistoides conspicillum***

50 cm (19.5 in.) Indo-Pacific

Feeding Carnivorous. Small juveniles are difficult to adapt to aquarium foods. Subadults and adults readily accept all meaty foods.

Compatibility Not safe with invertebrates; fishes also at risk.

Hazards Unpredictable biter; may seriously damage aquarists' fingers, heaters, and electrical wires.

A magnificent-looking fish for very large aquariums with large, robust tankmates. It often develops a nasty, dangerous disposition, even though it may be initially peaceful.

Vertebrata; Actinopterygii; Tetraodontiformes; Balistidae

Undulate Triggerfish ***Balistapus undulatus***

30 cm (11.7 in.) Indo-Pacific

Feeding Carnivorous. Readily accepts most meaty foods.

Compatibility Not safe with invertebrates; fishes also at risk.

Hazards Unpredictable biter; may seriously damage aquarists' fingers, heaters, and electrical wires.

A very handsome species with a notorious reputation for attacking and killing its tankmates. Should only be kept in very large fish-only aquariums with other big, robust species—better yet in an aquarium of its own.

Vertebrata; Actinopterygii; Tetraodontiformes; Balistidae

Niger Triggerfish ***Odonus niger***

40 cm (15.6 in.) Indo-Pacific

Feeding Carnivorous; accepts most meaty foods.

Compatibility Harmless with corals, but sponges and free-living invertebrates are at risk. Several specimens may be kept together if approximately the same size and introduced simultaneously.

Hazards May inflict nasty bites on aquarists' fingers.

This is a triggerfish with relatively mild manners, suitable for sizable reef tanks. It does, however, eventually attain a size requiring a large aquarium and companions large enough to avoid being eaten.

Vertebrata; Actinopterygii; Tetraodontiformes; Balistidae

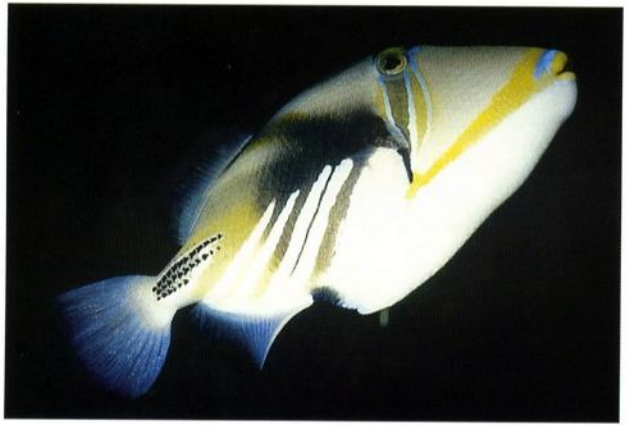
Sargassum Triggerfish ***Xanthichthys ringens***

25 cm (9.8 in.) Tropical Western Atlantic

Feeding Omnivorous; readily accepts most meaty foods, but also eats live and dried algae (*Sargassum*).

Compatibility Harmless to corals, but shrimps and some free-living invertebrates are likely to be eaten. Usually not aggressive toward other fishes. Unlike most triggerfishes, this species can be kept in groups.

This is a fairly peaceful triggerfish, hardy, and a possible candidate for the reef aquarium.



Vertebrata; Actinopterygii; Tetraodontiformes; Balistidae

Picasso Triggerfish ***Rhinecanthus aculeatus***

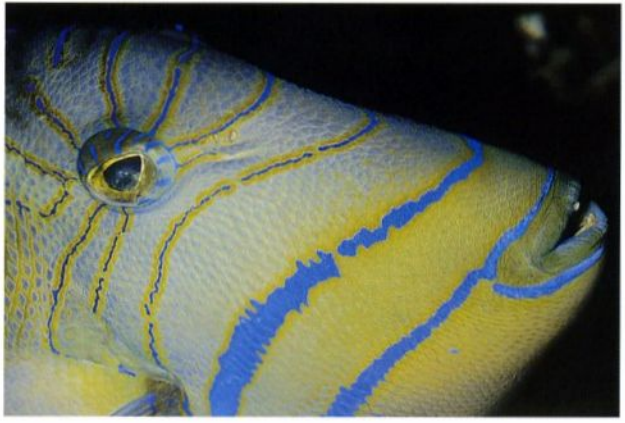
25 cm (9.8 in.) Indo-Pacific

Feeding Carnivorous; readily accepts most meaty foods.

Compatibility Not safe with most invertebrates and smaller fishes. May be kept in groups if introduced simultaneously.

Hazards May inflict painful bites on aquarists' fingers, and is likely to damage heaters and electrical wires.

One of several flamboyantly colored triggerfishes, but a species that should be kept in a fish-only aquarium with other large, robust species.



Vertebrata; Actinopterygii; Tetraodontiformes; Balistidae

Queen Triggerfish ***Balistes vetula***

55 cm (21 in.) Tropical Atlantic

Feeding Carnivorous; readily accepts most meaty foods.

Compatibility Not safe with invertebrates; fishes also at risk. Becomes more aggressive as it matures.

Hazards A notorious biter; may seriously damage aquarists' fingers, heaters, and electrical wires.

This is an impressive fish with beauty and a formidable personality. It is appropriate only for large fish-only aquariums with other big, robust species—or a tank of its own.

Vertebrata; Actinopterygii; Tetraodontiformes; Monacanthidae

Tasseled Filefish ***Chaetodermis penicilligera***

30 cm (11.7 in.) Indo-Pacific

Feeding Omnivorous; eats algae and most meaty foods.

Compatibility Except for the most noxious and strong stinging anemones and soft corals, corals should not be considered safe with this fish. Will not bother other fishes, but may be harassed by active and aggressive species.

A fascinating, curious-looking species that is a valuable addition to special aquariums, but not safe in most reef tanks. Grows very quickly.

Vertebrata; Actinopterygii; Tetraodontiformes; Monacanthidae

Longnose Filefish ***Oxymonacanthus longirostris***

12 cm (4.7 in.) Indo-Pacific

Aquascaping Requires a large aquarium filled with live *Acropora* spp. corals that can withstand constant polyp harvesting.

Feeding Eats only *Acropora* polyps in the wild. Rarely accepts substitute foods, and is likely to starve shortly after being imported.

Compatibility Not reef safe. Does best in small groups.

Conservation Must generally be considered impossible to keep without its natural food source.

An alluring fish, but extremely difficult to keep. For experts only.

Vertebrata; Actinopterygii; Tetraodontiformes; Ostraciidae

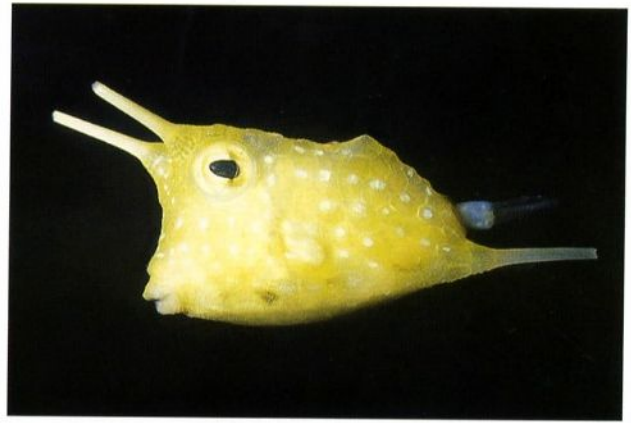
Longhorn Cowfish ***Lactoria cornuta***

45 cm (17.6 in.) Indo-Pacific

Feeding Carnivorous. Accepts a variety of meaty foods.

Compatibility Not reef safe. Should not be kept with aggressive fishes. May release the potent poison ostracitoxin if the animal is injured, stressed, or dying. The toxin is particularly lethal to fishes.

Although very cute at the small size when it is usually purchased, this is a problematic fish suitable only for special aquariums.



Vertebrata; Actinopterygii; Tetraodontiformes; Ostraciidae

Spotted Boxfish ***Ostracion meleagris***

16 cm (6.2 in.) Indo-Pacific

■ **Feeding** In the wild, it feeds on various invertebrates (polychaetes, mollusks, crustaceans, sponges). Difficult to adapt to substitute foods. Often starves in the aquarium.

■ **Compatibility** Not safe with any invertebrates. Must not be kept with aggressive fishes. Likely to release a deadly (to fishes) toxin if the animal is injured, stressed, or dying.

A most appealing fish, but very hard to keep and a toxic time bomb, only suitable for special aquariums. Males are blue, females brown.

Vertebrata; Actinopterygii; Tetraodontiformes; Tetraodontidae

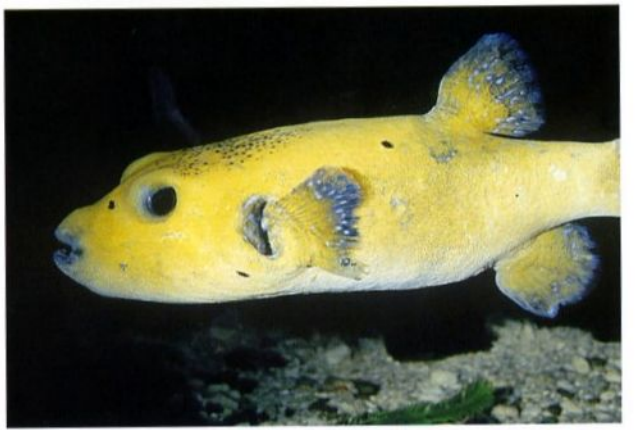
Golden Puffer ***Arothron meleagris***

50 cm (19.5 in.) Indo-Pacific, Eastern Pacific

Feeding Omnivorous; eats various invertebrates, including corals and algae. Offer a variety of meaty and algae-based foods.

Compatibility Not safe with invertebrates.

This is a huge, greedy fish that demands plenty of food and a very large aquarium with efficient filtration. Several color forms are known, including the popular yellow morph shown. A brownish, whitespotted morph is often sold as the Guinea Fowl Puffer.



Vertebrata; Actinopterygii; Tetraodontiformes; Tetraodontidae

Saddled Toby ***Canthigaster valentini***

10 cm (3.9 in.) Indo-Pacific

Feeding Omnivorous; accepts a variety of meaty and algae-based foods. Should be fed several times daily.

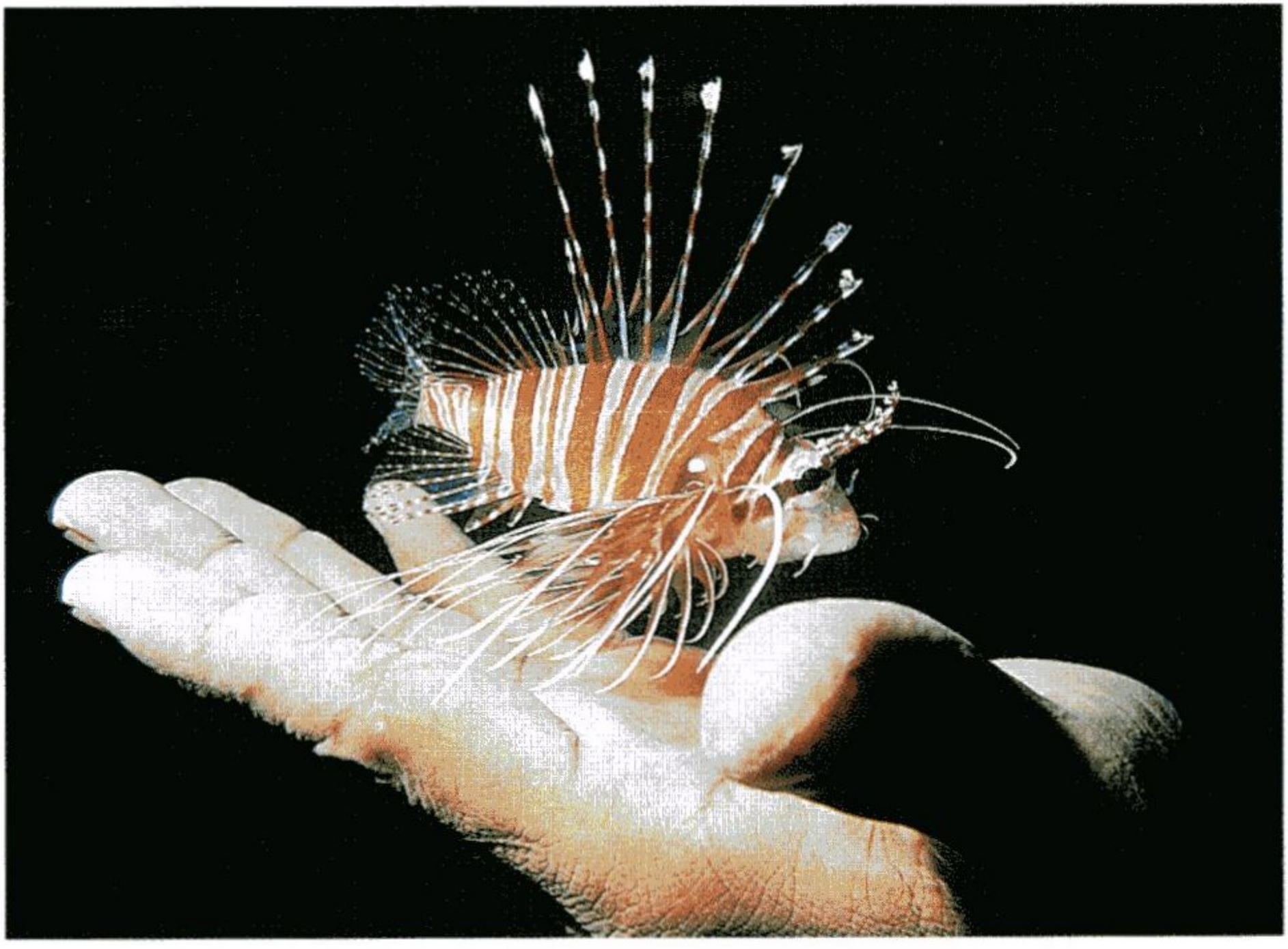
Compatibility Not safe with invertebrates. Generally safe with large fishes, but may nip fins. Keep singly or in male-female pairs.

This and other tobies, or sharpnose puffers, are interesting little fishes with an innocuous appearance, but they are predators on many invertebrates and are likely to nip the fins of other fishes. Recommended for fish-only systems with larger tankmates, or a species tank.

Fireworms, or polychaete worms, in the Family Amphinomidae can deliver a painful sting with thousands of delicate, sharp spines.

Armed with deadly venom, the Stonefish (*Synanceia verrucosa*) is too dangerous to be kept in most home aquariums.

All sea cucumbers, such as this *Bohadschia graeffei*, can release the fish-killing poison holothurin if threatened or attacked.



Foolhardy or careless hobbyists may be stung by captive lionfishes that can deliver a defensive wound that is very painful and occasionally requires emergency medical care.

The Sixline Soapfish (*Grammistes sexlineatus*) is cute as a juvenile but grows quite large and can excrete grammistin if it becomes stressed, toxic slime that may wipe out a whole tank.

Elephant Ear Anemone (*Amplexidiscus fenestrafer*) is a fascinating animal but can close up like a purse and capture fishes.

Hydroids in the genus Aglaophenia appear harmless but can deliver an extremely powerful sting that may hurt for days afterward.

TABLE 3-1

ORGANISMS COMMONLY FOUND WITH LIVE ROCK

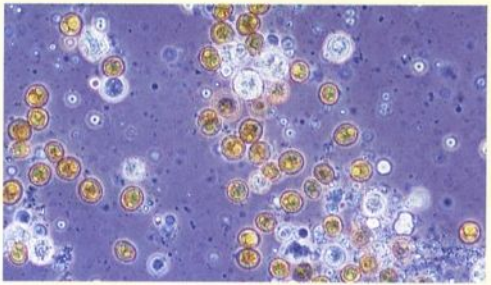
GROUP	GENUS / SPECIES	COMMENTS
SINGLE-CELLED ANIMALS	*Homotrema rubrum*	Small, red colonies with thick, whitish pseudopods.
SPONGES	Many species	Normally grow slowly; can take years to establish well-developed populations.
HYDROIDS	*Myrionema* sp.	Caution! A boring hydrozoan that can overgrow the tank completely.
JELLYFISHES	Polyp stage of *Nausithoe*	Very common on fresh live rocks; resemble small, brown tubes.
ANEMONES	*Aiptasia* sp. (glass anemones)	Can reproduce quickly by pedal laceration. Must be controlled to prevent overgrowth.
	Anemonia sp.	Small, brownish with lighter tentacle tips. Can reproduce quickly by pedal laceration. Must be controlled to prevent overgrowth.
STONY CORALS	*Euphyllia glabrescens* *Psammocora* sp. *Porites* spp.	Typically introduced as small polyps; discovered later, after the rock has been in the tank for a while and the polyps have started to grow.
WORMS	Free-living bristleworms	Many species are common. Nocturnal. Some can reach a considerable length.
	Scaleworms e.g., *Lepidonotus* sp.	A few cm long and dorso-ventrally compressed. Very common. Harmless.
	Terebellid worms	Buried in small holes in the rock; expose many thin, slippery, transparent or white tentacles on the surface. Harmless.
	Feather dusters	*Bispira viola* is common and can form huge populations in the reef aquarium. Harmless.
	Calcareous tubeworms, e.g., *Vermiliopsis* sp.	Build small, white, spiral-shaped tubes. Red or orange tentacle crowns. Harmless.
	Peanut worms (Order Sipunculida)	Live in holes in the rocks; can even drill holes. Very common and important decomposers of live rock. Nocturnal. Harmless.
MOLLUSKS	Many different species, especially small snails from the genera *Stomatella* and *Mitra* as well as countless species of algae-eating snails. Boring-mussels from the genera *Pholas* and *Lithophaga* are also common.	*Mitra* snails feed on other mollusks. *Stomatella* spp. are algae grazers. The boring mussels are found in holes in the rocks; only the edge of the mantle is seen.
CRUSTACEANS	Amphipods and copepods	Establish large populations and are important food supplies for many organisms.
	Crabs	Many species; some are harmful, but most do little damage. Some can grow to a considerable size. Hairy coral crabs can be detrimental to corals.
ECHINODERMS	Several small brittle and serpent stars	Many reproduce successfully in the reef aquarium. *Asterina* sp., a tiny sea star, is a harmless algae grazer that can multiply enormously.

SOME ORGANISMS WITH SPECIAL WATER MOTION NEEDS

GROUP	GENUS / SPECIES
Sponges (Porifera)	Most species
Corals (Cnidaria; Alcyonacaea)	*Dendronephthya* spp.
	Scleronephthya spp.
	Chironephthya spp.
Corals (Cnidaria; Gorgonacaea)	*Diodogorgia nodulifera*
	Gorgonia spp.
	Ellisellidae; almost all nonphotosynthetic gorgonians
Sea Pens (Cnidaria; Pennatulacea)	All species
Corals (Cnidaria; Scleractinia)	*Tubastraea* spp.
Mollusks (Mollusca; Polyplacophora)	*Acanthopleura* spp., *Ischnochiton* spp., and others
Mollusks (Mollusca; Bivalvia)	*Spondylus* spp.
Echinoderms (Echinodermata)	All species of feather stars (Crinoidea)
	Shingle urchins, *Colobocentrotus* spp.

PHOTOSYNTHESIS AND CELLULAR RESPIRATION: THE BASICS

Photosynthesis is the biochemical reaction upon which all life on Earth depends. Only plants can carry out photosynthesis, which takes place in green chloroplasts inside plant cells. In photosynthesis, the inorganic compounds carbon dioxide and water react to form organic carbohydrate compounds (sugars) and oxygen. Light powers the reaction, which, simplified, can be written like this:



Zooxanthellae cells magnified 400X. These algal symbionts help drive the productivity of coral reefs.

$$6CO_2 + 12H_2O + \text{light} = C_6H_{12}O_6 + 6O_2 + 6H_2O$$

carbon dioxide + water + light = carbohydrates + oxygen + water

Plants are the only organisms that can form organic compounds out of inorganic materials and are therefore called primary producers. The formation of one mole of carbohydrate requires 2,000-2,500 kcal light energy of which about 30% is bound in the carbohydrate molecules as chemical energy. This chemical energy is transferred into the food chain and utilized by all living organisms during cellular respiration.

In cellular respiration, all organisms burn nutrients to create the energy that sustains normal life activities. Cell respiration takes place in all living cells where nutrients react with oxygen to form energy—leaving water and carbon dioxide as waste products. This is the reverse reaction of photosynthesis:

$$C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O + ATP$$

carbohydrates + oxygen = carbon dioxide + water + chemical energy

ATP (adenosine triphosphate) is an energy storage and transfer compound used in most biological systems. One mole of carbohydrates burned in respiration sets free about 672 kcal of chemical energy. The above reactions are very simplified, but the complete chemistry of photosynthesis and cell respiration can be found in most biology textbooks.

TABLE 5-2

POTENTIALLY INJURIOUS AQUARIUM INHABITANTS

NOTE: This table includes examples of aquarium inhabitants that we consider most likely to be harmful to an aquarist. By listing an animal we do not necessarily mean that all aquarists should avoid it. Neither does the failure to list an animal imply that it will never pose risks under particular circumstances. (Animals that are poisonous only if eaten are not included.)

TAXONOMIC GROUP	RISKS/SYMPTOMS	TREATMENT	PRECAUTIONS
SPONGES (Porifera)	Some sponges cause irritation and skin rashes, partly because of glassy spicules that pierce the skin, partly because of mucous toxins. Symptoms include itching, burning, and occasional redness.	Remove visible spicules. Topical application of household-strength vinegar may give relief.	Never handle unfamiliar sponge species without wearing rubber gloves.
FIRE CORAL (Cnidaria; Hydrozoa; *Millepora* spp.)	These coral-like hydroids can inflict powerful stings. Pain varies from a mild prickling sensation to a severe stinging pain and burning itch. Redness, swelling, and blisters may occur; occasional nausea. Cardiovascular or respiratory problems are very rare.	Apply household-strength vinegar or 20% aluminum sulfate in case unexploded stinging cells are still attached. Keep affected area away from more sensitive areas (face and eyes).	Never handle fire coral with bare hands. Always wear rubber gloves.
FEATHER HYDROIDS (Cnidaria; Hydrozoa; *Aglaophenia* spp. and *Lytocarpus* spp.)	Some of the fernlike hydroids that occasionally enter the aquarium trade have very strong and painful stings. Rashes, swelling, and blisters may occur. Rash may last for several days. Side effects, such as abdominal pain, cramps, and nausea, have been reported.	Apply household-strength vinegar or 20% aluminum sulfate in case unexploded stinging cells are still attached.	Never handle feather hydroids with bare hands. Always wear rubber gloves.
TUBE ANEMONES (Cnidaria; Ceriantipatharia; *Cerianthus* spp.)	Most species have only a mild effect on humans, because the stinging cells have difficulty piercing human skin. Occasional stings may occur, with burning pain, rashes, and small blisters.	Apply household-strength vinegar or 20% aluminum sulfate in case unexploded stinging cells are still attached.	Wear rubber gloves when handling unfamiliar species.
SEA ANEMONES (Cnidaria; Zoantharia; Actiniaria)	Most species have only a mild or no effect on humans, because the stinging cells have difficulty piercing human skin. Some species can cause burning pain, rashes, and small blisters. Anemone tentacles sometimes fasten to human skin with such strength that they are torn from the animal when the human draws away.	Remove any attached tentacles (use tweezers); apply household-strength vinegar or 20% aluminum sulfate to inactivate unexploded stinging cells that are still attached.	Wear rubber gloves when handling unfamiliar species.
STONY CORALS (Cnidaria; Zoantharia; Scleractinia)	Most species have only a mild or no effect on humans, because the stinging cells have difficulty piercing human skin. Some species can cause burning pain, rashes, and small blisters.	Apply household-strength vinegar or 20% aluminum sulfate in case unexploded stinging cells are still attached.	Wear rubber gloves when handling unfamiliar species.

(continued on next page)

TABLE 5-2

POTENTIALLY INJURIOUS AQUARIUM INHABITANTS (CONT.)

TAXONOMIC GROUP	RISKS/SYMPTOMS	TREATMENT	PRECAUTIONS
ERRANT BRISTLE-WORMS (Annelida; Polychaeta)	Several errant (free-living) bristleworms have fine, sharp bristles that can easily embed in human skin. Bristles may or may not contain venom. Contact can produce a rash, swelling, and numbness. Itching, burning, and pain may persist for many days. In severe cases, symptoms may include increased pulse rate, palpitations, fainting, and chest pains.The fireworms in the Family Amphinomidae (primarily *Eurythoe* and *Hermodice*) are particularly nasty in this respect. Some worms inflict painful bites as well.	Remove embedded bristles by using adhesive tape to peel them off. Apply methylated spirits, calamine, or other cooling lotion to calm the sting. In case of bites, wash the area with an antiseptic soap.	Never handle bristleworms with bare hands. Always wear rubber gloves.
MANTIS SHRIMPS (Arthropoda; Crustacea; Stomatopoda)	Mantis shrimps have large claws developed for raptorial feeding, similar to those found in the praying mantis insect. The inner edge of the claw usually has long spines or is shaped like the blade of a knife. The strike has, in some of the larger species, been estimated to have a force similar to that of a 22-caliber bullet. They have been reported to break thick glass aquarium walls. Aquarist's fingers can be badly bruised if the animal strikes.	Clean and disinfect wound thoroughly. Depending on the nature of the wound, it can be treated at home or may need medical attention.	Be very careful when working in a tank with large mantis shrimps. Any hand feeding must be done with long tweezers or a feeding stick.
CONE SNAILS (Mollusca; Gastropoda; *Conus* spp.)	All *Conus* spp. are venomous, and some (e.g., *C. geographus* and *C. textile*) can be deadly to humans. They use harpoonlike radula teeth to quickly inject their venom. Symptoms are immediate burning pains, followed by swelling and numbness. More serious symptoms are paralysis, which may become general, difficulties in swallowing and speaking, and vision problems. Heart failure and breathing difficulties or even stoppage may follow. There appears to be great variation in people's susceptibility to the venom.	Apply pressure bandage to the area that is stung to delay the spread of venom. Get victim immediate medical attention. If necessary, give artificial respiration and cardiac massage. Any victim likely to vomit should be put on his/her side to avoid choking.	Never keep cone snails in a home aquarium unless you are 100% certain you are dealing with a harmless species. Use heavy protective gloves or forceps if you ever need to handle a specimen.
BLUE-RINGED OCTOPUSES (Mollusca; Cephalopoda; *Hapalochlaena* spp.)	Blue-ringed octopuses use highly toxic venom to kill their prey quickly. This venom has caused human deaths as well. The bite is rarely felt and does not cause pain or swelling. The toxins affect nerve transmissions; the first symptoms may be numbness, blurred vision, and difficulty speaking. Paralysis, including respiratory paralysis, may develop.	Apply pressure bandage to the area that is bitten (if this can be located), in order to delay the spread of venom. Get victim immediate medical attention; watch closely for any need to give artificial respiration. Any victim likely to vomit should be put on his/her side to avoid choking.	Never keep a blue-ringed octopus in a home aquarium. Use heavy protective gloves and long-handled nets if you ever need to handle a specimen.

POTENTIALLY INJURIOUS AQUARIUM INHABITANTS (CONT.)

TAXONOMIC GROUP	RISKS/SYMPTOMS	TREATMENT	PRECAUTIONS
CROWN-OF-THORNS STARFISH (Echinodermata; Asteroidea; *Acanthaster planci*)	The sharp, heavy spines can puncture human skin and inject a toxin. The wound is intensely painful and produces swelling, redness, heat, and numbness. Stings from many spines at once may result in vomiting. Secondary infections often develop. Spine tips can break off in the wound, resulting in late complications that may require surgery.	Any embedded spines or parts thereof should be removed. Immersing the affected body part in 50°C (122°F) water can help break down the toxins. Avoid scalding the skin. Clean and disinfect the wound.	Never handle a Crown-of-Thorns Starfish with bare hands. Always wear thick protective gloves.
LONG-SPINED SEA URCHINS (Echinodermata; Echinoidea; *Diadema* spp.)	The very long, sharp spines easily penetrate human skin and break off. No toxin has been isolated from these sea urchins, but the wound is intensely painful, which suggests that there is venom present. Swelling and secondary inflammation may occur.	Any embedded spines or parts thereof should be removed. Clean and disinfect the wound.	Do not handle long-spined sea urchins with bare hands. Always wear gloves.
COLLECTOR URCHIN (Echinodermata; Echinoidea; *Tripneustes gratilla*)	This urchin species has venomous pedicellariae among its spines. Most are too small to puncture human skin, but extended contact or contact with tender skin (such as on the inside of an arm) may lead to a severe sting. Aching pains and localized swelling and redness are the immediate symptoms. More severe effects, like decreased blood pressure and heart rhythm disorder, are uncommon.	Immerse the affected body part in 50°C (122°F) water to break down the toxins. Avoid scalding the skin. Applying 20% aluminum sulfate may also help.	Never handle Collector Urchins with bare hands. Always wear rubber gloves.
FLOWER SEA URCHINS (Echinodermata; Echinoidea; *Toxopneustes* spp.)	These urchins are the most dangerous to humans. The large, open, flowerlike pedicellariae are highly venomous, and the painful stings may lead to severe symptoms, including collapse, paralysis, and/or breathing difficulties.	Immerse the affected body part in 50°C (122°F) water to break down the toxins. Get victim immediate medical attention. If necessary, give artificial respiration and cardiac massage.	Never handle flower sea urchins with bare hands. Always wear rubber gloves.
SHARKS AND RAYS (Chondrichthyes)	Although sharks and rays of reasonable "home aquarium size" are hardly dangerous to humans, bear in mind that they can still inflict serious bite wounds. Secondary infections may occur.	Clean and disinfect wound thoroughly. Depending on the nature of the wound, it can be treated at home or may need medical attention.	Take care when working in a tank containing a shark or ray. Never hand feed these animals without the aid of long tongs or a feeding stick.
MORAY EELS (Osteichthyes; Anguilliformes; Muraenidae)	Although morays are not typically dangerous to humans, they can still inflict serious bite wounds. Contrary to popular belief, morays do not have a venomous bite, but secondary infections, due to dirty teeth, are common.	Clean and disinfect wound thoroughly. Depending on the nature of the wound, it can be treated at home or may need medical attention.	Take care when working in a tank with moray eels. Never hand feed without the aid of a feeding stick.

(continued on next page)

TABLE 5-2

POTENTIALLY INJURIOUS AQUARIUM INHABITANTS (CONT.)

TAXONOMIC GROUP	RISKS/SYMPTOMS	TREATMENT	PRECAUTIONS
LIONFISHES (Osteichthyes; Scorpaeniformes; *Pterois* spp. and *Dendrochirus* spp.)	All scorpionfishes are more or less venomous, but the beautiful lionfishes are of particular concern because of their popularity with aquarists. The spines in the dorsal, anal, and pectoral fins are equipped with venom glands. Stings give immediate burning pains, often followed by inflammation of lymph glands, breathing difficulties, vomiting, and muscular spasms.	Immerse the affected body part immediately in 50°C (122°F) water to break down the toxins (soak for 30 to 90 minutes, or until the pain is reduced). Get victim immediate medical attention. If necessary, administer artificial respiration.	Take the utmost care when working in a tank with lionfishes. Never hand feed without the aid of long tongs or a feeding stick.
STONEFISHES (Osteichthyes; Scorpaeniformes; *Synanceia* spp. and *Inimicus* spp.)	Stonefishes have the most powerful fish venom known. The apparatus (connected to the dorsal fin spines) they use to inject the venom into the victim is also very sophisticated and effective. Symptoms are similar to those described for lionfishes, but are much more dramatic. Human deaths have occurred. Even in less serious cases, the recovery period may last two to three months.	*Immediately* get victim medical attention. If necessary, administer artificial respiration.	Never keep stonefishes in home aquariums. Use heavy gloves if you ever need to handle a specimen.
SURGEONFISHES (Osteichthyes; Perciformes; Acanthuridae)	All surgeonfishes possess one or more sharp, lancelike spines on the sides of the base of the tail. When the fish becomes excited or bends its body (depending on the species) the spine can be extended at right angles. With a quick movement of the tail, large specimens are capable of inflicting deep and painful wounds. Secondary infections may occur.	Clean and disinfect wound thoroughly. Depending on the nature of the wound, it can be treated at home or may need medical attention.	Take care when working in any tank housing large surgeonfishes and when netting and moving them.
RABBITFISHES (Osteichthyes; Perciformes; Siganidae)	Dorsal, pelvic, and anal spines are associated with venom glands. Stings can give symptoms similar to (but usually weaker than) those described for lionfishes. Stings are less likely to occur because rabbitfishes normally lack the curious nature of lionfishes.	Immerse the affected body part immediately in 50°C (122°F) water to break down the toxins (soak for 30 to 90 minutes, or until the pain is reduced). Professional medical attention may become necessary.	Take care when working in a tank with rabbitfishes.
TRIGGERFISHES AND PUFFERFISHES (Osteichthyes; Tetraodontiformes; Balistidae and Tetraodontidae)	These fishes and several of their relatives (boxfishes, filefishes, porcupinefishes) have strong beaklike teeth and powerful jaws. Large specimens can inflict serious bite wounds. Secondary infections may occur.	Clean and disinfect wound thoroughly. Depending on the nature of the wound, it can be treated at home or may need medical attention.	Take care when working in a tank with large trigger- and pufferfishes. Never hand feed without the aid of long tongs or a feeding stick.

TABLE 5-1

SPECIAL COMPATIBILITY CONSIDERATIONS

NOTE: These are only examples of groups in which compatibility problems are likely to occur. The failure to list a particular group or species does not mean it poses no risks in its interaction with other aquarium inhabitants. Be sure to check the needs and habits of any species before introducing it into a tank. Consult the Stocking Guide section of this book (starting on page 98) or other literature carefully.

TAXONOMIC GROUP	PROBLEM	CONSIDERATION
FISHES		
Sharks and rays, Elasmobranchii	Predation	In general, sharks and rays require large aquariums and will feed on any invertebrate or fish they can catch. Careful research and planning is imperative before purchasing any of these animals.
Moray eels, Muraenidae	Predation	Most moray eels will eat any crustacean or fish (preference varies between species) slow enough to catch and small enough to swallow. Aggressive species may also inflict damage on fishes that are too large to be caught. Check the literature before making a purchase.
Frogfishes, *Antennarius* spp.	Predation	Frogfishes will eat any crustacean or fish small enough to swallow (up to half their own size or more). Slender fishes may be at risk even if they are as long, or longer, than the frogfish. Frogfishes are clever hunters and can catch even fast-moving species.
Seahorses and pipefishes, Syngnathidae	Vulnerability	These slow feeders must be kept in peaceful tanks with as little competition as possible. They are at high risk of being caught and eaten by anemones or severely burned by any stinging cnidarians.
Scorpionfishes, Scorpaenidae	Predation	Most scorpionfishes will eat any crustacean or fish small enough to swallow. They are patient, effective hunters and can catch even fast-moving species.
Dottybacks, *Pseudochromis* spp.	Aggression	Most dottybacks are aggressive defenders of their territory, especially toward fishes that bear some resemblance to themselves.
Butterflyfishes, Chaetodontidae	Predation	Many—but not all—species will eat stony corals as well as other invertebrates. Look up the eating habits of any prospective purchase.
Angelfishes, Pomacanthidae	Predation	Most angelfish species eat sponges, tunicates, and other sedentary invertebrates (including corals). Do not acquire an angelfish without knowing the habits and reputation of the species.
Hawkfishes, Cirrhitidae	Predation, aggression	These aggressive predators are likely to eat any crustacean or fish small enough to swallow. Most species will fiercely defend their territory from any intruder that bears a resemblance to itself.
Wrasses, Labridae	Predation	Many wrasses will eat a variety of benthic invertebrates, such as crustaceans, mollusks, and worms. Study the size, eating habits, and reputation of the species before bringing it home.
Blennies, Blenniidae	Predation	Although the vast majority of members of this family are peaceful herbivores, some species are aggressive predators on other animals, ranging from corals to fishes. Careful study of the literature is important prior to any purchase.

(continued on next page)

TABLE 5-1

SPECIAL COMPATIBILITY CONSIDERATIONS (CONT.)

TAXONOMIC GROUP	PROBLEM	CONSIDERATION
Mandarinfishes, *Synchiropus* spp.	Vulnerability	These slow, shy feeders should be kept in peaceful tanks with as little competition as possible, or in very large tanks where they can easily escape. They are at high risk of being caught and eaten by anemones.
Triggerfishes, Balistidae	Predation, aggression	These often-aggressive fishes may bite anything within reach. Most species can only be kept with large, tough fishes and stinging or distasteful cnidarians (anemones and corals).
Filefishes, Monacanthidae	Predation	Several species will eat stony corals and other invertebrates. Check the reference books before making a purchase.
Boxfishes, Ostraciidae	Toxins	Several boxfishes may release a very strong toxin (ostracitoxin) if the animal is injured, stressed, or dying. The toxin is potentially lethal to most companions in the tank. The toxicity varies between species. Check the literature before making a purchase.
SPONGES		
Hard Blue Sponge, *Xestospongia* sp.	Toxins	This beautiful and commonly imported sponge species has been known to release poisons when dying. The toxins can severely damage soft corals and other invertebrates.
WORMS		
Social Feather Duster, *Bispira brunnea*	Vulnerability	These small, delicate worms are often torn apart and eaten by brittlestars. Fishes, crabs, and other animals that prey on worms will also consider them an easy target.
CRUSTACEANS		
Mantis shrimps, Gonodactylidae	Predation, aggression	These aggressive predators have a notorious reputation for attacking tankmates that are perceived as prey or threats. Other crustaceans and small fishes are particularly vulnerable.
Harlequin Shrimp, *Hymenocera picta*	Predation	Feeds exclusively on sea stars; will harm and eventually kill any sea star in the aquarium. Can therefore be used to reduce/exterminate populations of the tiny *Asterina* spp. that sometimes proliferate in aquariums.
Anemone shrimps, *Periclimenes* spp.	Vulnerability	These fascinating shrimps are relatively safe once they have settled down in a host anemone, but during the introduction phase, they stand a very high risk of being eaten by any animal capable of catching them. The same may be said of many other small and medium-sized shrimps.
Hermit crabs, Diogenidae	Predation, aggression	Many large and medium-sized hermit crabs are highly predatory and aggressive, capable of inflicting damage on many invertebrates. There are also perfectly peaceful, herbivorous species. Study the literature closely before deciding on a hermit crab species for your aquarium.
Decorator Crab, *Camposcia retusa*	Predation	This indiscriminate carnivore is likely to feed on all available food in an aquarium—including corals and most other invertebrates.
Spider Crab, *Stenorhynchus seticornis*	Predation	Feeds extensively on tubeworms, but also likely to pick on many other sedentary invertebrates.

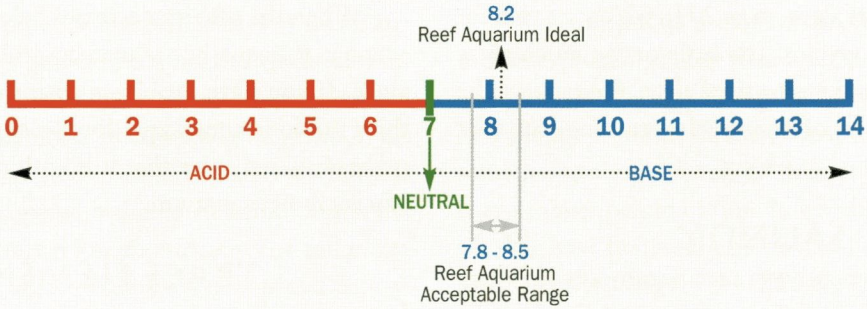
SPECIAL COMPATIBILITY CONSIDERATIONS (CONT.)

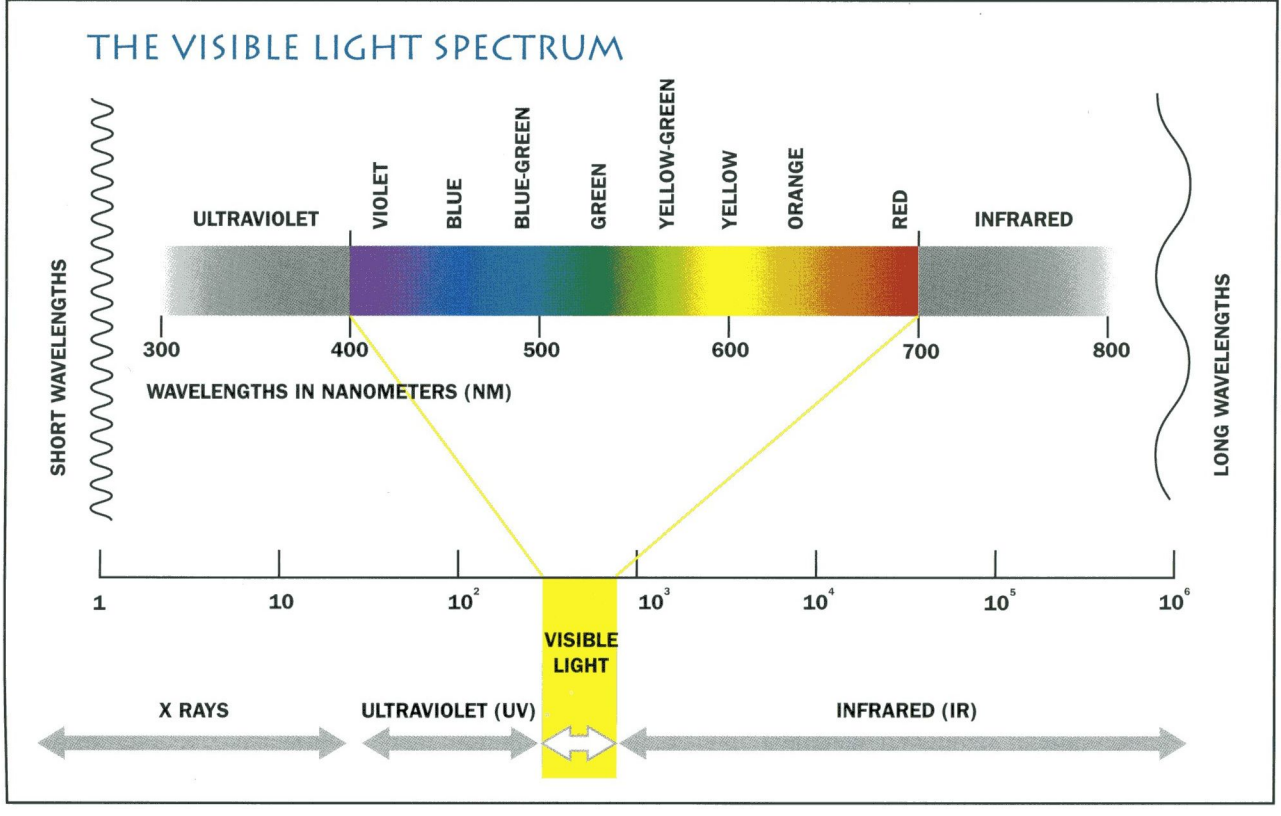
TAXONOMIC GROUP	PROBLEM	CONSIDERATION
ECHINODERMS		
Sea stars, Asteroidea	Predation	Many sea stars target various invertebrates, including sponges and corals, as part of their natural diet. Check the reference books closely before deciding on a sea star species for your aquarium.
Serpent and brittle stars, Ophiuroidea	Predation	Although the majority of serpent stars feed on detritus and carrion and are quite peaceful toward larger invertebrates, they may injure or eat delicate invertebrates like feather duster worms.
Green Brittle Star, *Ophiarachna incrassata*	Predation	Although this common brittle star is an opportunistic feeder that occasionally captures fishes, it is still relatively safe to keep in reef aquariums.
Sea urchins, Echinoidea	Predation	Most sea urchins are primarily herbivores, which may be a problem for a macroalgae community (particularly red coralline algae), and many will also ingest a variety of encrusting animals, like tunicates, bryozoans, and sponges. Some species even feed on corals. Study the literature closely before deciding on a sea urchin species for your aquarium.
Sea cucumbers, Holothuroidea	Toxins	The very strong toxin holothurin, which is concentrated in the intestines of most sea cucumbers, may be released if the animal is injured, stressed, or dying. Relative toxicity varies between species, but all may pose a risk to fishes.
CNIDARIANS		
Fire corals, *Millepora* spp.	Toxins	This and other hydroids have a strong nettling toxin that can cause problems for other animals. Must not be placed close to corals.
Tube anemones, *Cerianthus* spp.	Toxins	These anemones can inflict deadly stings on other animals. Should not be placed close to corals or other sedentary invertebrates. The tentacles may reach much farther than you initially suspect.
Sea anemones, Actiniaria	Toxins	Many species have strong nettling abilities and can inflict damage on other animals; they even eat slow-moving crustaceans and fishes. Beware: many anemones will actively move around the aquarium. Not all anemones are equally toxic. Check the literature before any purchase.
Elephant Ear Anemone, *Amplexidiscus fenestrafer*	Predation, aggression	This large disc anemone is capable of trapping even large and active prey, like fishes and shrimps, by forming a funnel that rapidly closes around the victim.
Crystal Coral, *Galaxea fascicularis*	Toxins	This coral's powerful stinging abilities deserve respect. Place well away from other corals. Beware: this species has extremely long sweeper tentacles that are extended during the night.
Hammer Coral, *Euphyllia ancora*	Toxins	The powerful stinging abilities of this coral deserve respect. Keep out of reach of other corals. Other species in the genus *Euphyllia* are less toxic, but care should still be taken when placing a colony.
Bubble Coral, *Plerogyra sinuosa*	Toxins	Powerful stinging tentacles extend at night. Locate at a safe distance from other corals.

THE pH SCALE

Water (H_2O) is not only present in the molecular form of H_2O, but dissociates to the ions H^+ (acid) and OH^- (base). When H^+ and OH^- are equal, the water is neither acidic nor basic, but neutral with a pH equal to 7.0. A pH in the range of 0 to 6.999 is acid and has more H^+ than OH^-, while a pH from 7.001 to 14 is base with more OH^- than H^+. The amount of acid (H^+) is balanced against the amount of base (OH^-).

Each step on the pH scale is equal to a multiple of 10 in the concentration of H^+ to OH^-. A solution with pH = 5 contains 10 times as much H^+ as a solution with pH = 6 and hundreds of times more than a neutral solution of pH 7. In the reef aquarium, although the pH fluctuates throughout the day (slightly higher after a dark period), the value should remain in the acceptable range of 7.8 to 8.5.





must appreciate, because it can mean the difference between life and death in the aquarium.

LIGHT SPECTRUM

VISIBLE LIGHT IS ONLY A FRACTION of the electromagnetic spectrum, and what we see under an aquarium lighting hood is a mixture of blue, green, yellow, orange, and red colors separated by their wavelengths (see illustration, above). Some of these colors are more important than others for life in general, and marine plants and animals in particular. For example, chlorophyll in plants and zooxanthellae absorbs light best at wavelengths of 420 nm—corresponding to "actinic" blue lighting—and 670 nm in the red end of the spectrum.

Next to the blue light is the ultraviolet light, which is composed of long wavelength UV-A (important to many corals), medium wavelength UV-B (the radiation that causes sunburn), and short wavelength UV-C (which is deadly to all living tissue, but luckily largely blocked by the atmosphere). Next to red light is infrared radiation, also known as heat radiation.

The short wavelength blue light penetrates deepest into the ocean, while the longer red wavelengths are effectively absorbed by water. Exactly how far light penetrates depends on how clear the water is, but blue light always goes deepest. This is easily seen if you try to take underwater photographs in a few meters depth without using a flash. Although your brain sees beautiful colors, the photos will look blue when developed.

The surface of the water is seldom calm, but is broken by small or big waves. This curving of the surface causes the light beams to be bent and spread in all directions. The ripples also act as small lenses that can concentrate sunlight, producing **glitter lines** or concentrated rays of light typical in shallow-water situations.

The sandy bottom and the light surfaces of corals and rocks further reflect the radiation, spreading life-giving light to algae and animals living in crevices or under overhanging rocks and corals. The radiation on the shallow parts of a reef is in fact so strong that many algae prefer to grow in the semi-shade on the vertical sides of rocks or even under overhangs. In deeper areas, such as on a vertical reef slope at 20 m (66 ft.), algae can be the dominant group of organisms.

SYMBIOTIC ALGAE

THE TRUE REEF BUILDERS—the stony corals—greatly benefit from intense tropical solar radiation. In fact they